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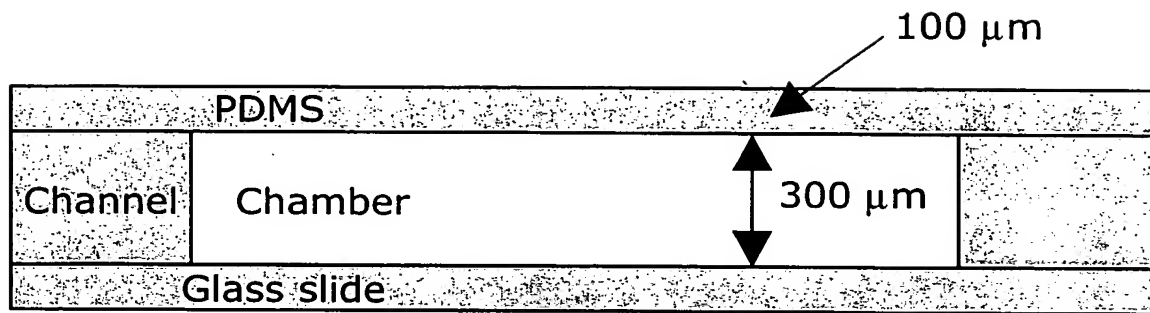


FIG. 1A

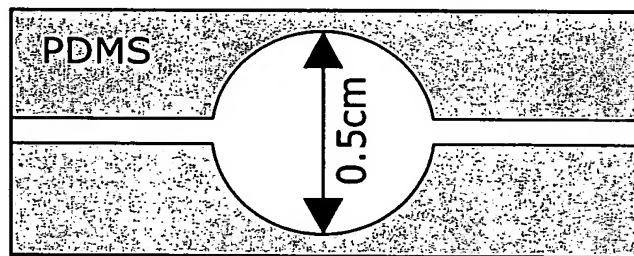


FIG. 1B

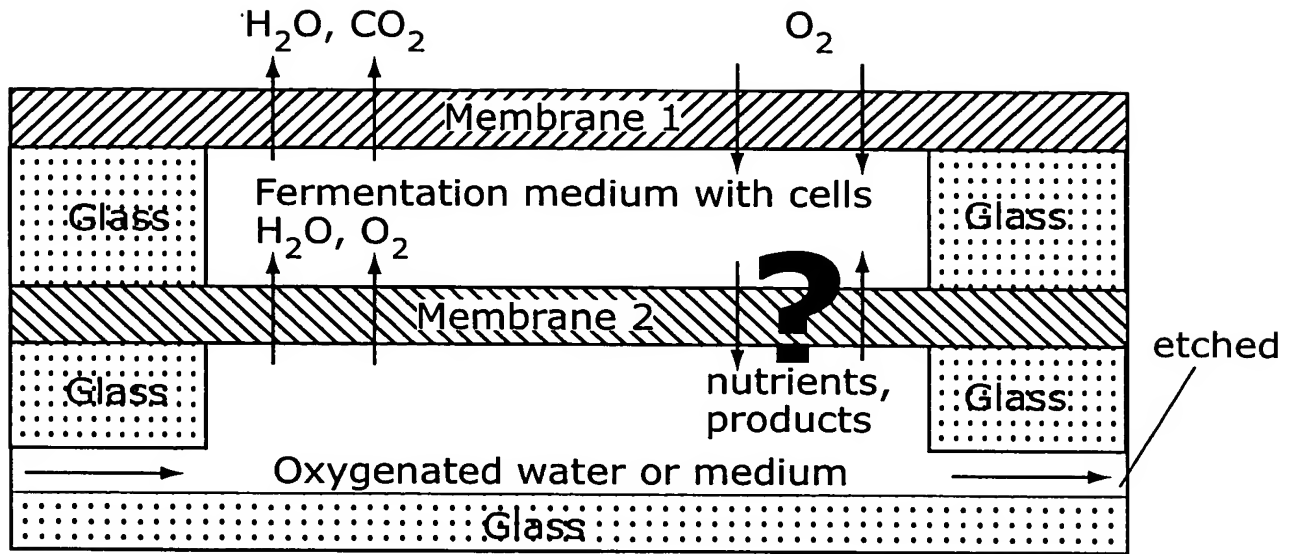


FIG. 2A

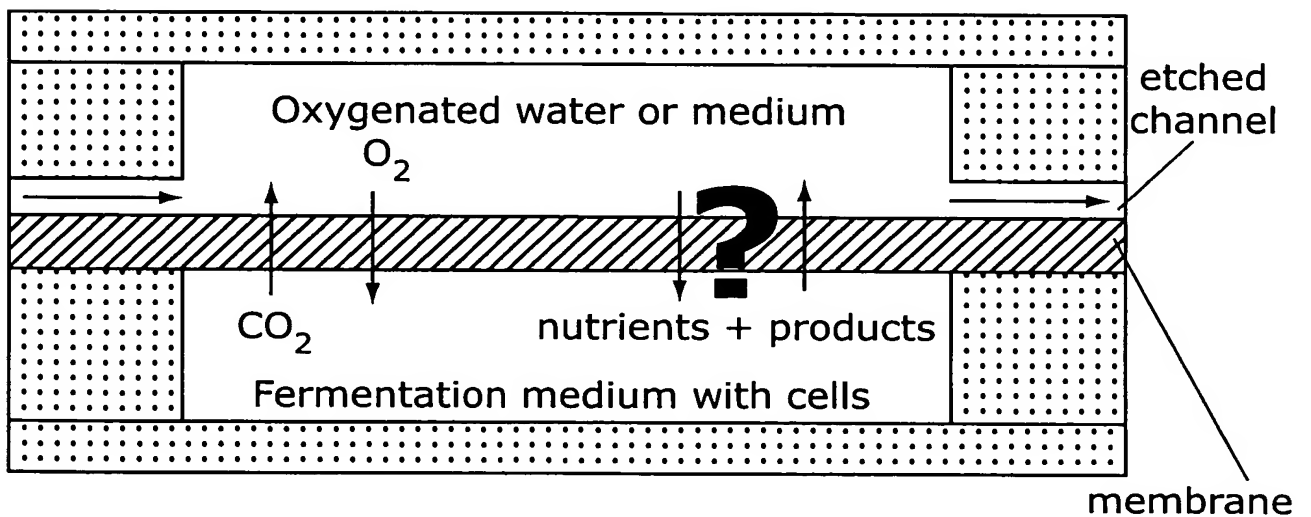


FIG. 2B

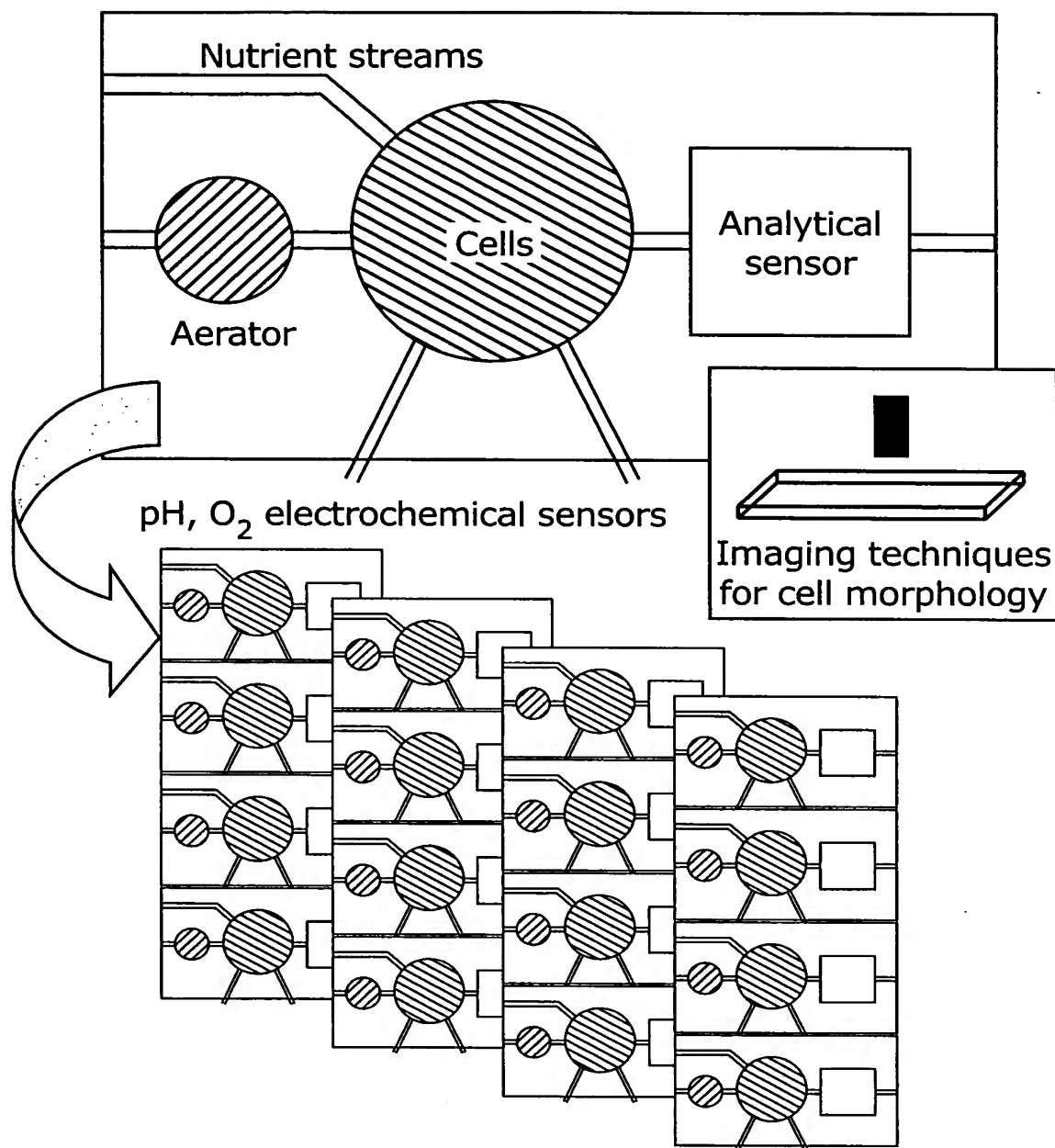


FIG. 3

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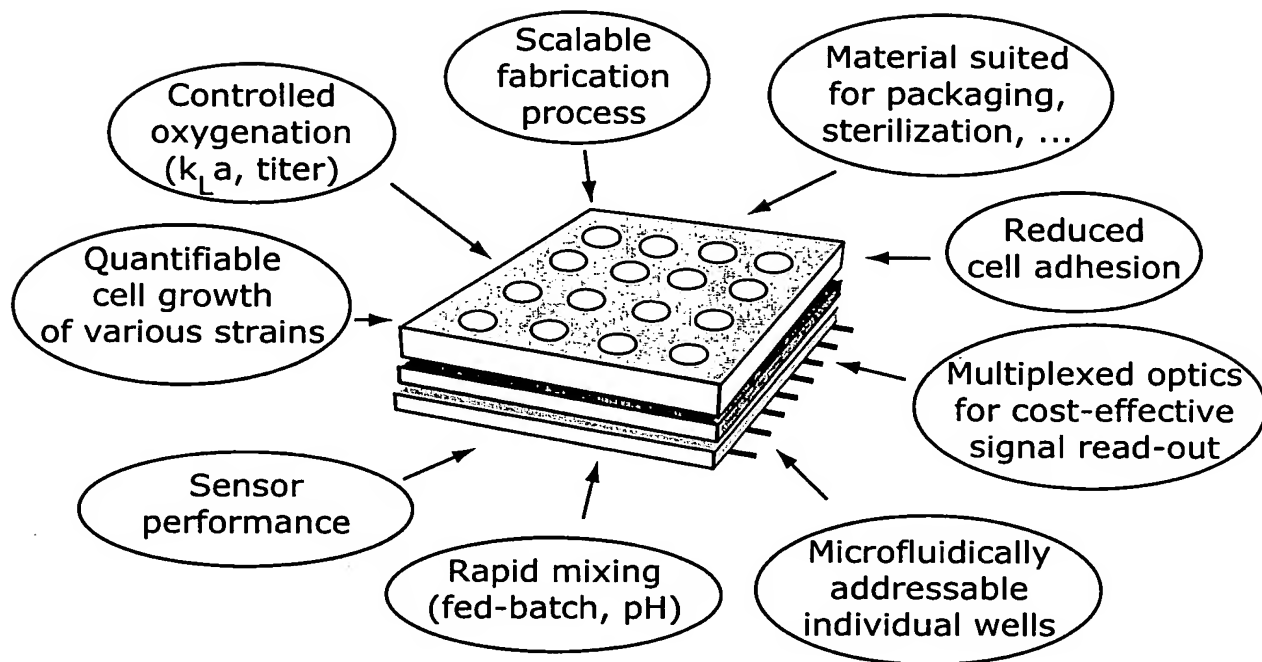


FIG. 4A

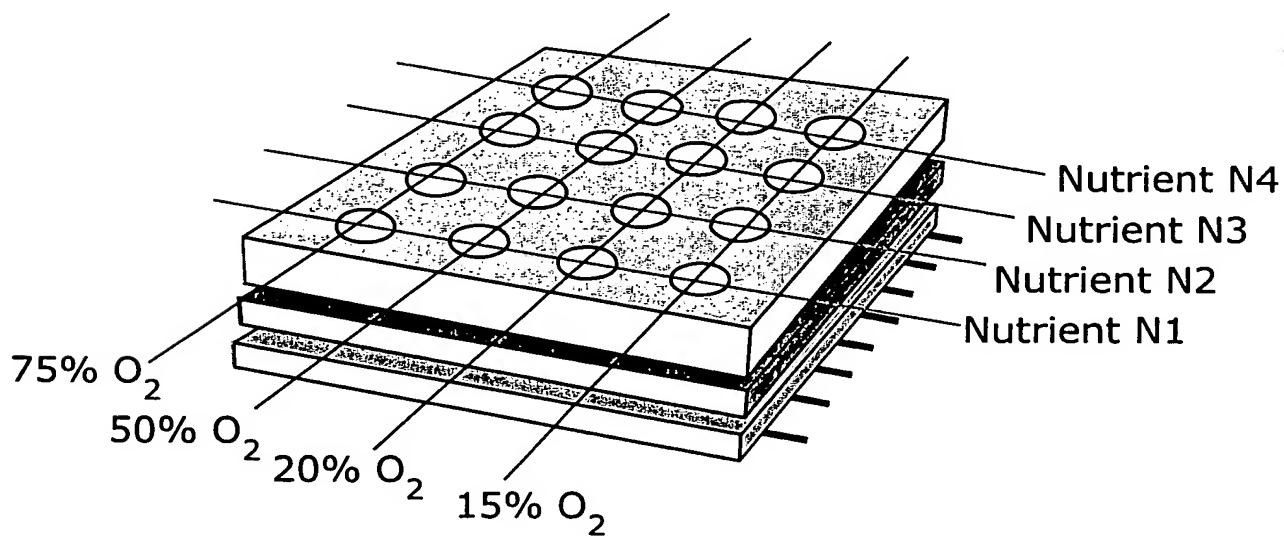
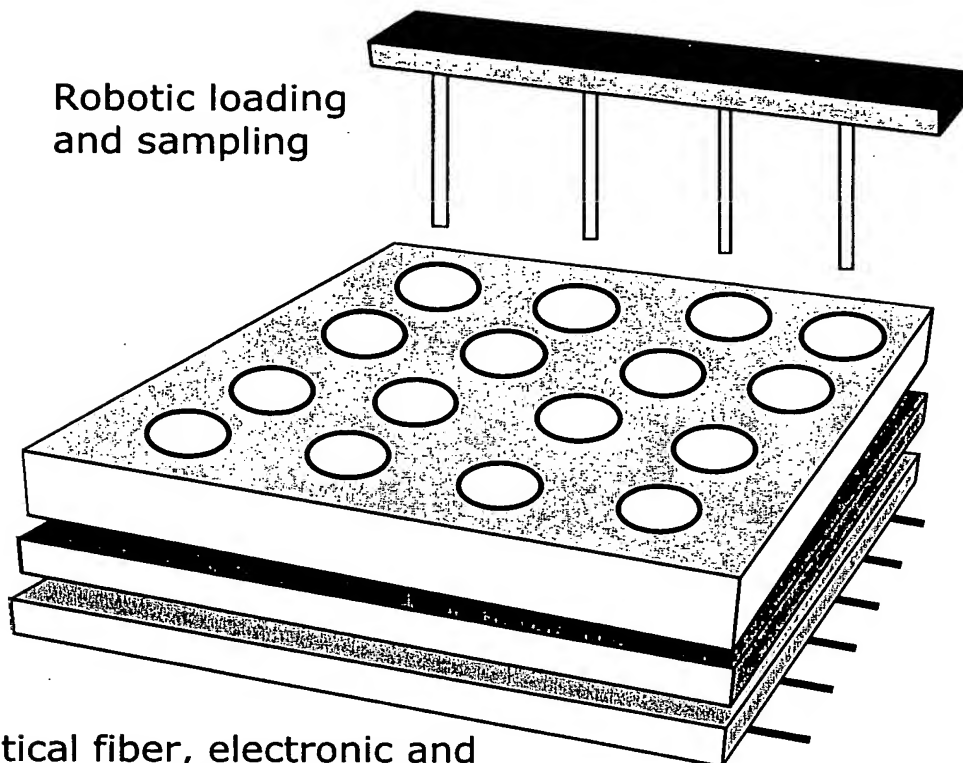


FIG. 4B

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Robotic loading  
and sampling



Optical fiber, electronic and  
heating interfaces

FIG. 4C

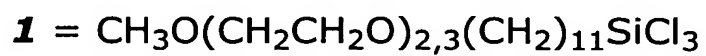
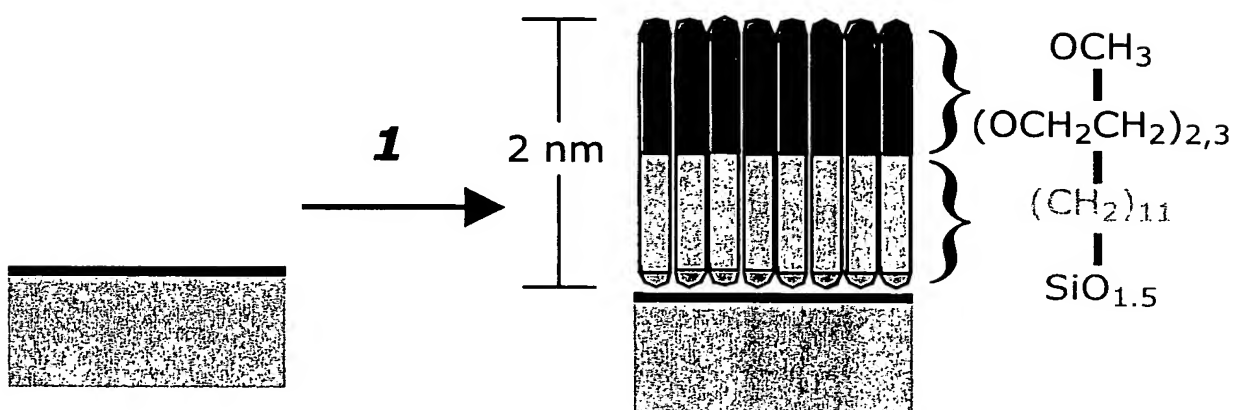


FIG. 5



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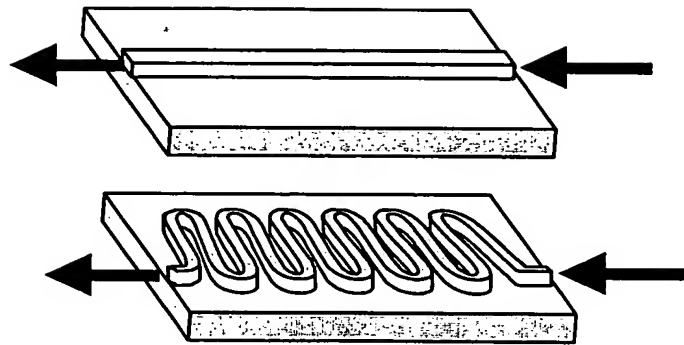


FIG. 8

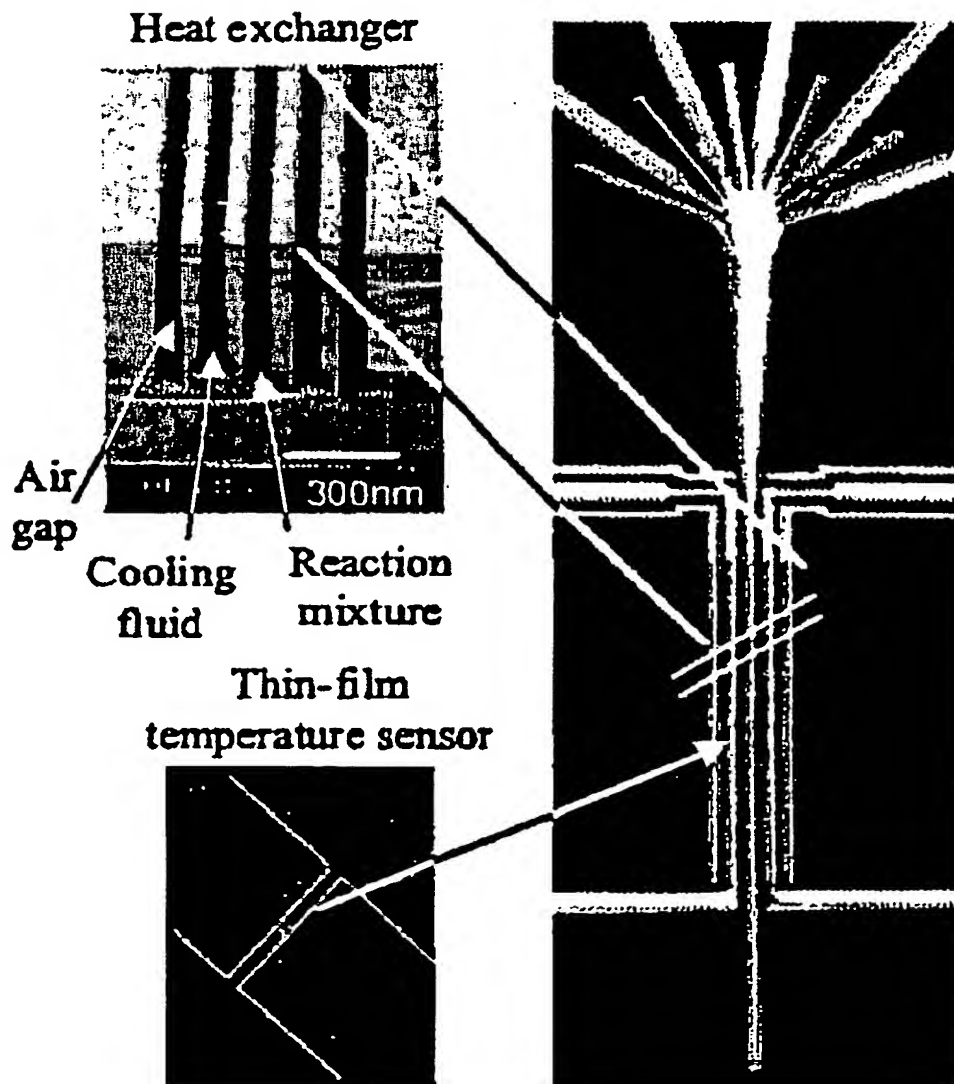
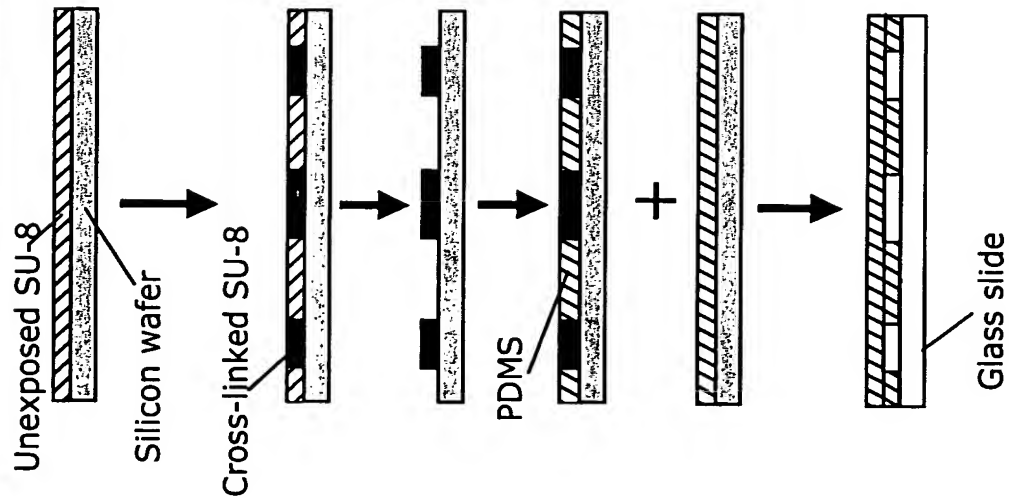


FIG. 9



## Microfermentor Fabrication



Spincoat SU-8 (photosensitive epoxy) onto wafer

Expose wafer through transparency mask

Post-bake wafer to allow SU-8 to cross-link where exposed (negative resist)

Develop wafer to create negative master mold

Cast fermentor walls

Spincoat PDMS onto plain wafer to create membrane

Join two layers of PDMS and bond to a glass slide (air plasma, epoxy, aquarium-grade silicone adhesive)

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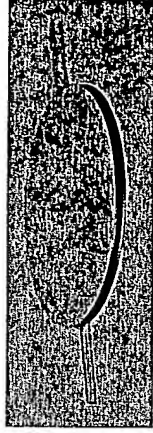
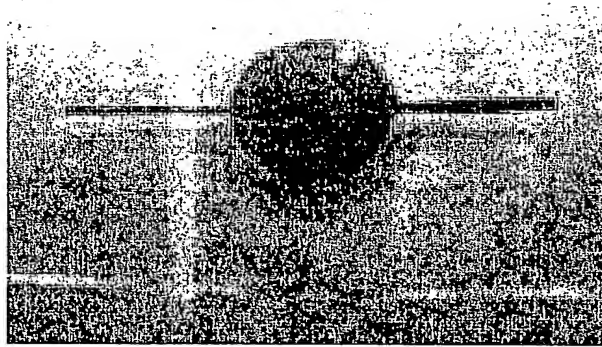


FIG. 10

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Microfermentor filled with phenol red

FIG. 11

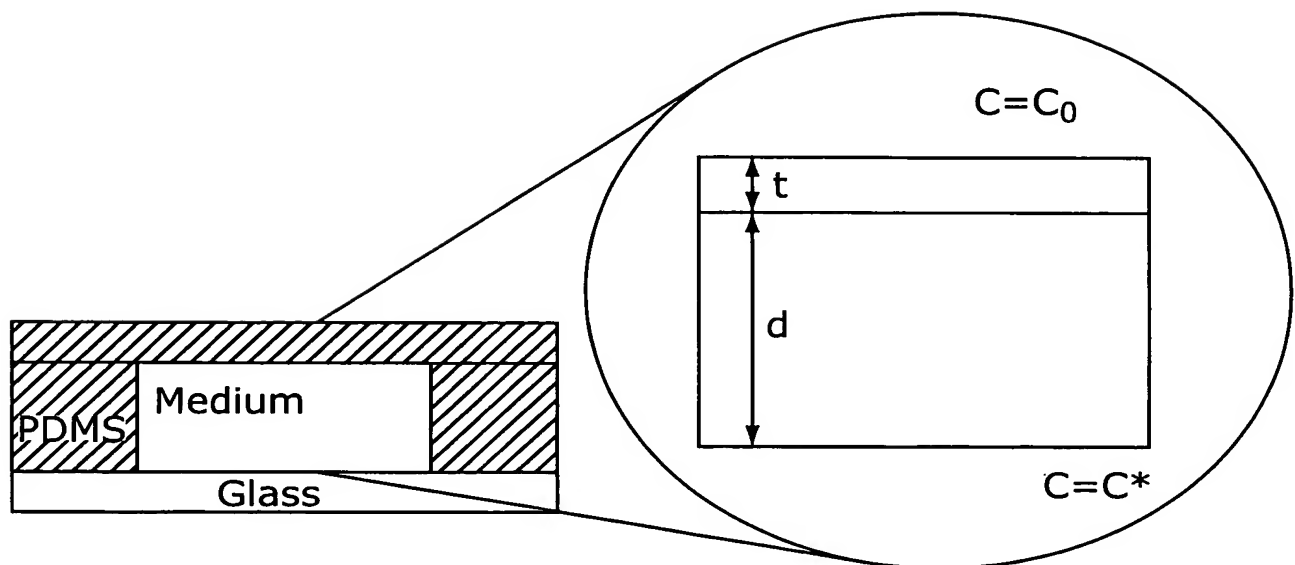


FIG. 12 BEST AVAILABLE COPY

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Concentration profile in medium  
(OUR = 30 mmol O<sub>2</sub>/L/h)  
(10<sup>11</sup> cells/L)

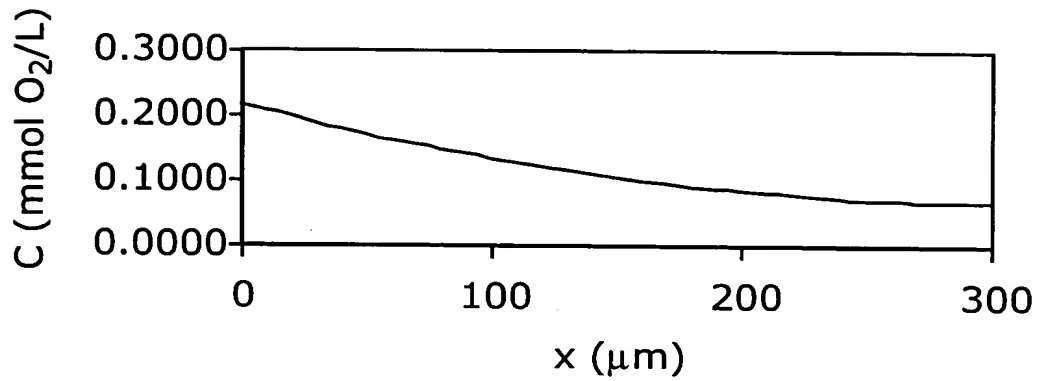


FIG. 13A

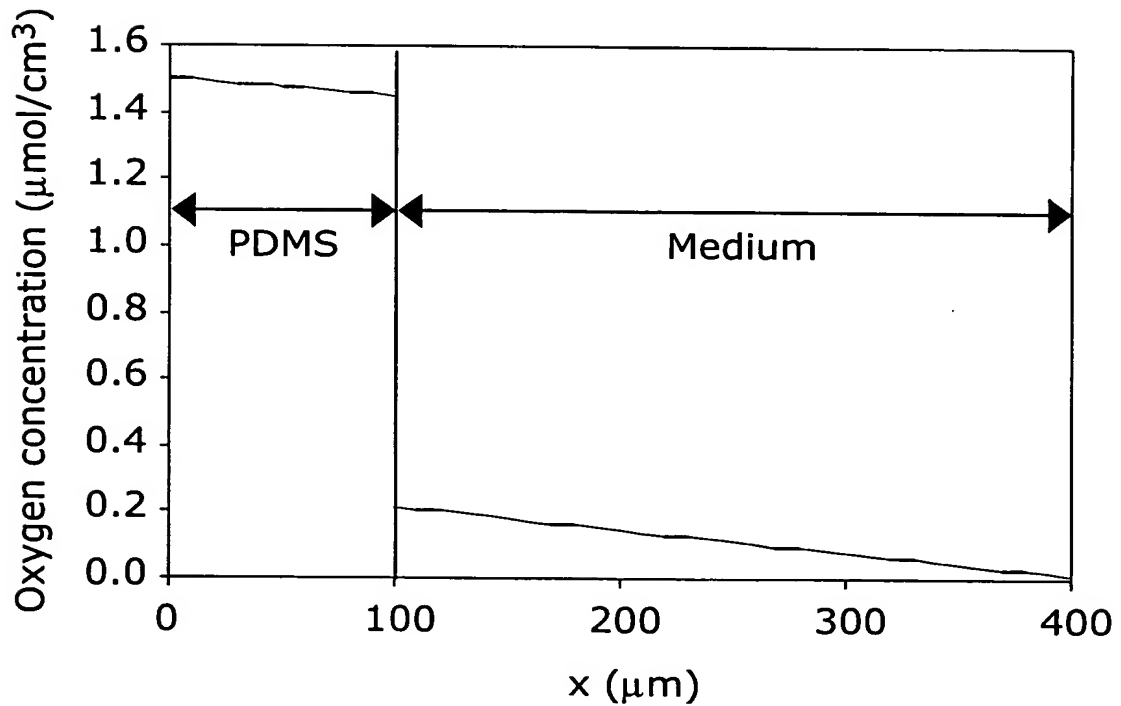
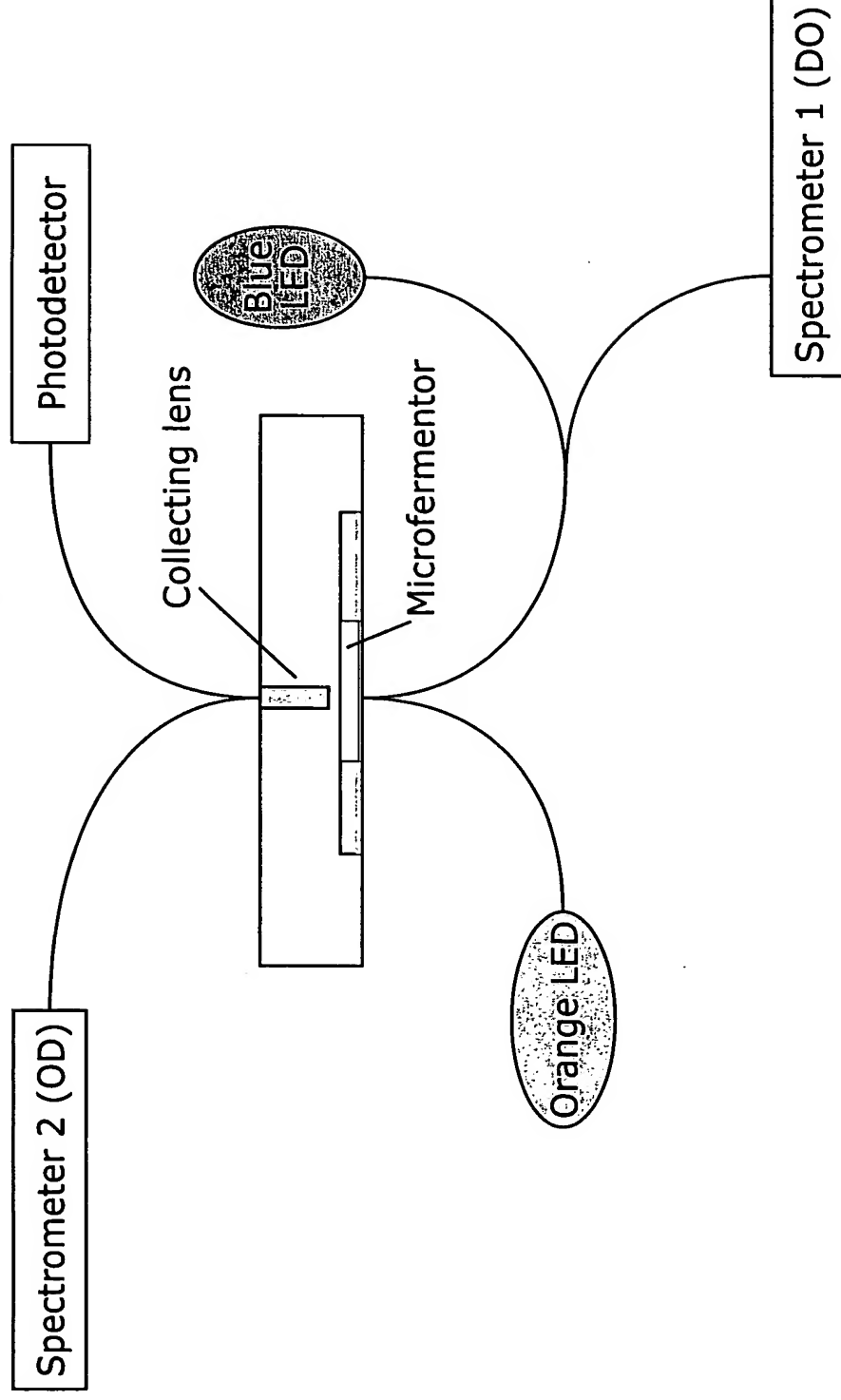


FIG. 13B

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## Microfermentor setup



**Optical density:** Transmittance measurement at ~600nm  
**Dissolved oxygen:** Fluorescence quenching of fluorophore

FIG. 14

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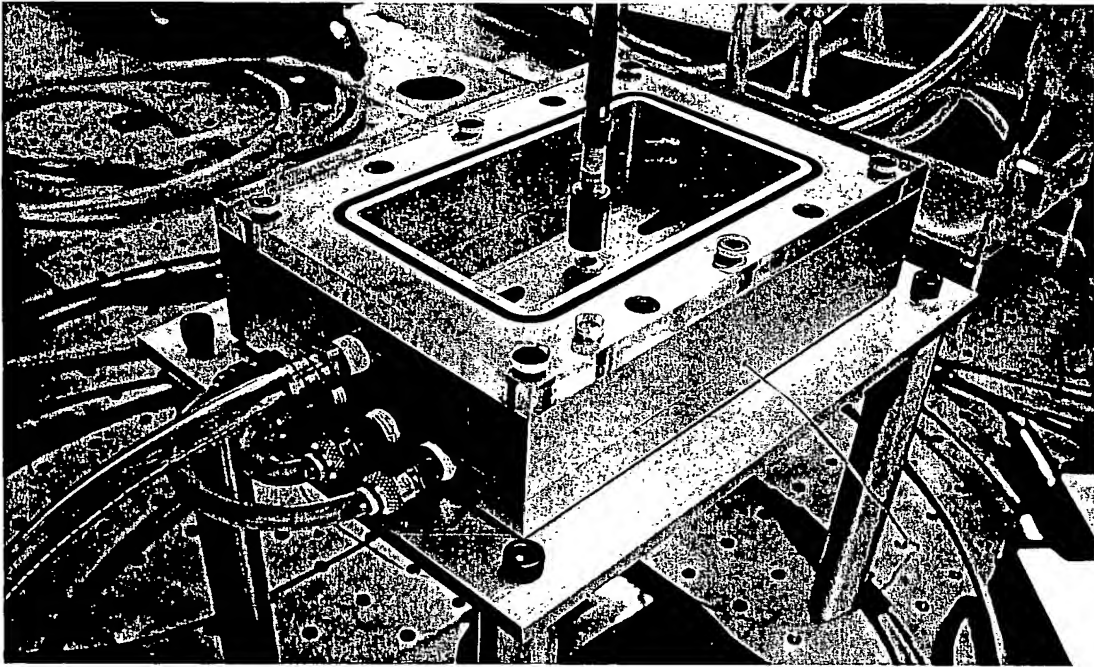
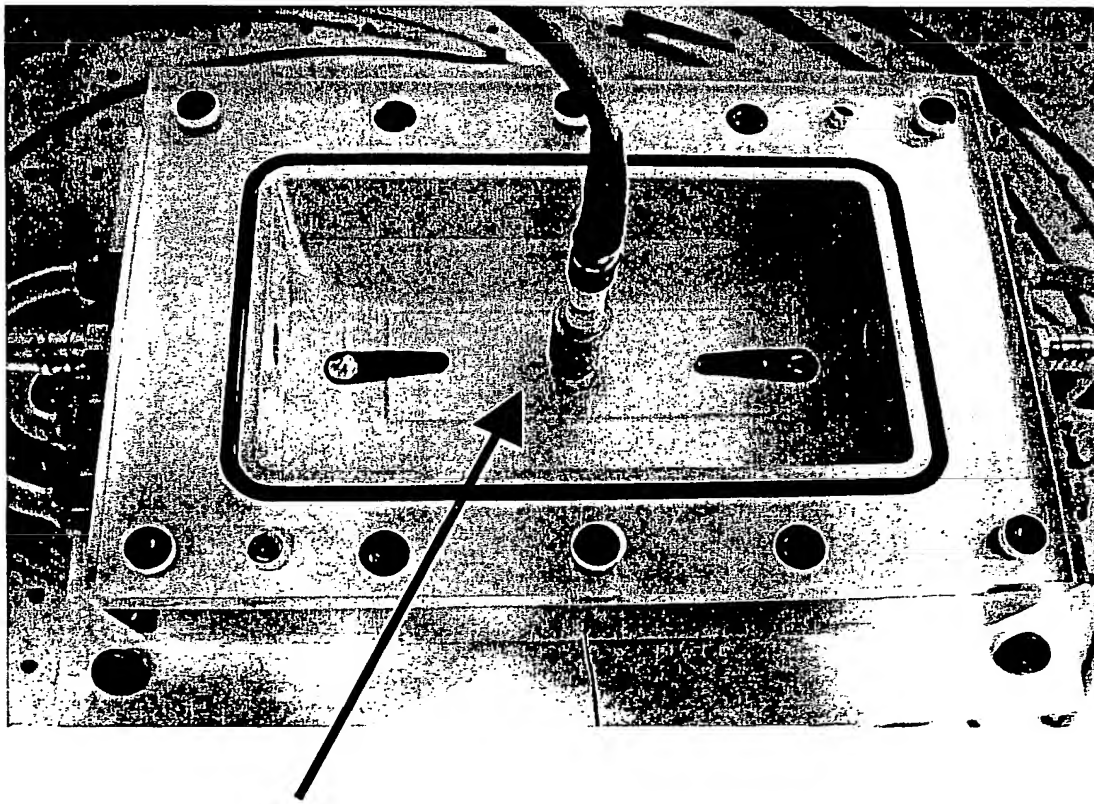


FIG. 15A

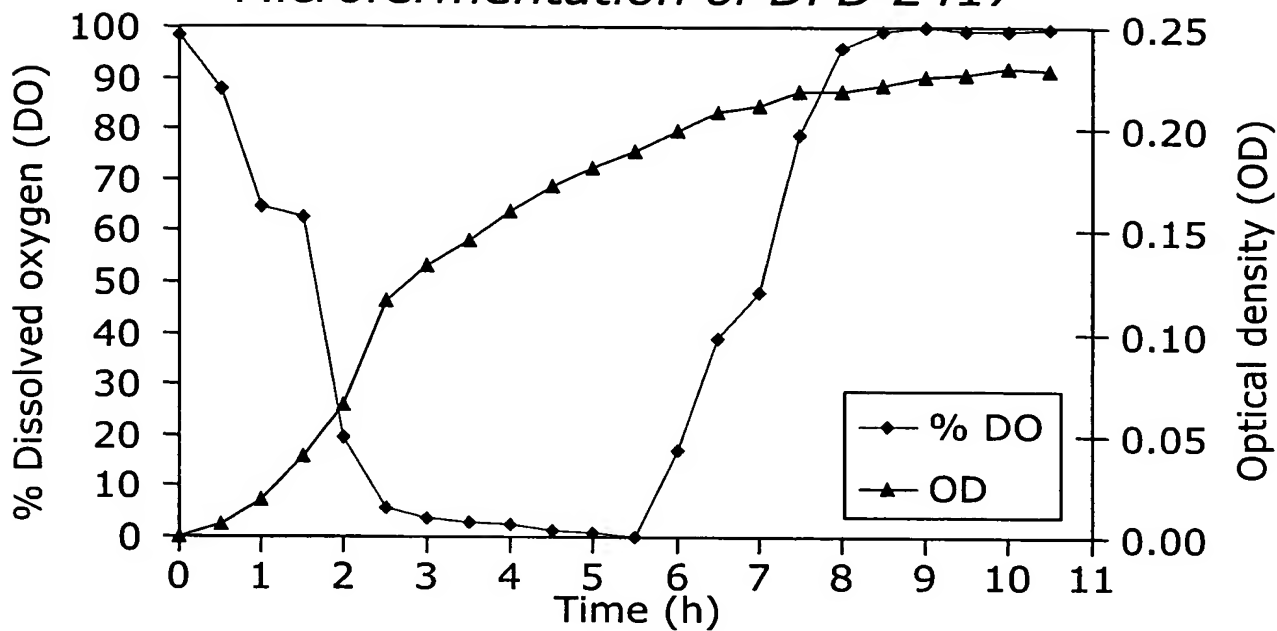


Microfermentor

FIG. 15B

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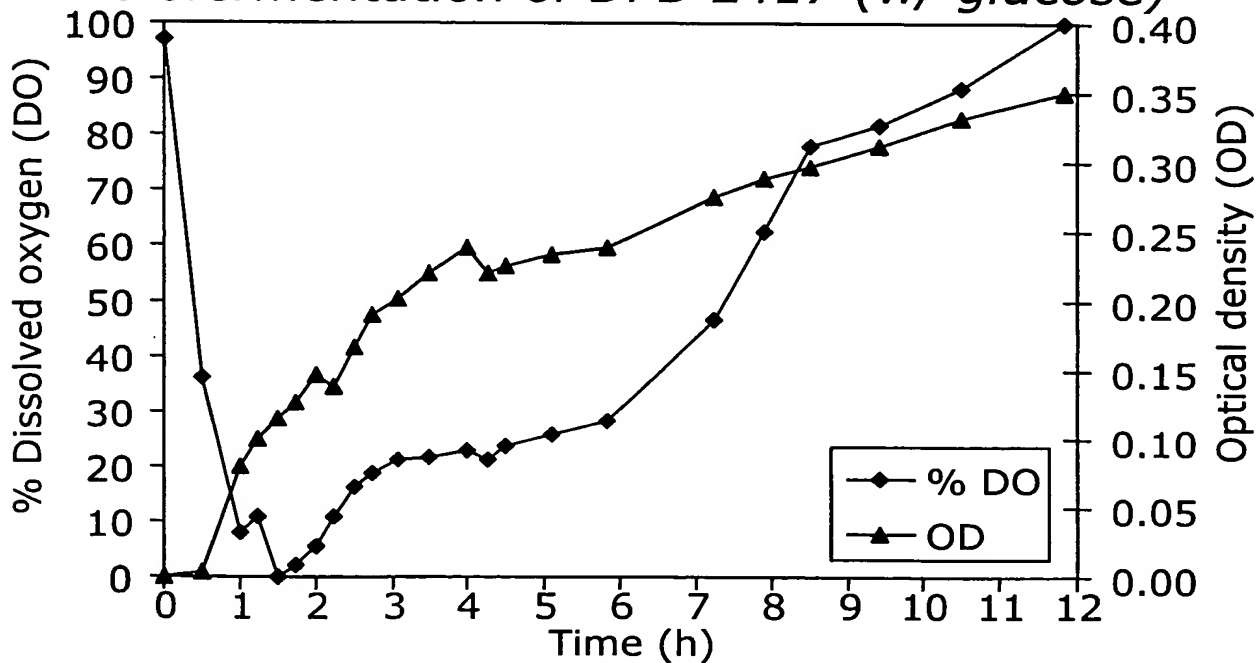
### Microfermentation of DPD 2417



<b>Conditions:</b>	37°C, 5% inoculum, LB+amp
<b>Light source for OD:</b>	orange LED (609nm peak)
<b>Sterilization:</b>	60s under UV (254nm)

FIG. 16

### Microfermentation of DPD 2417 (w/ glucose)



<b>Conditions:</b>	37°C, 5% inoculum, LB+amp +30g/L glucose
<b>Light source for OD:</b>	orange LED (609nm peak)
<b>Sterilization:</b>	60s under UV (254nm)

FIG. 17

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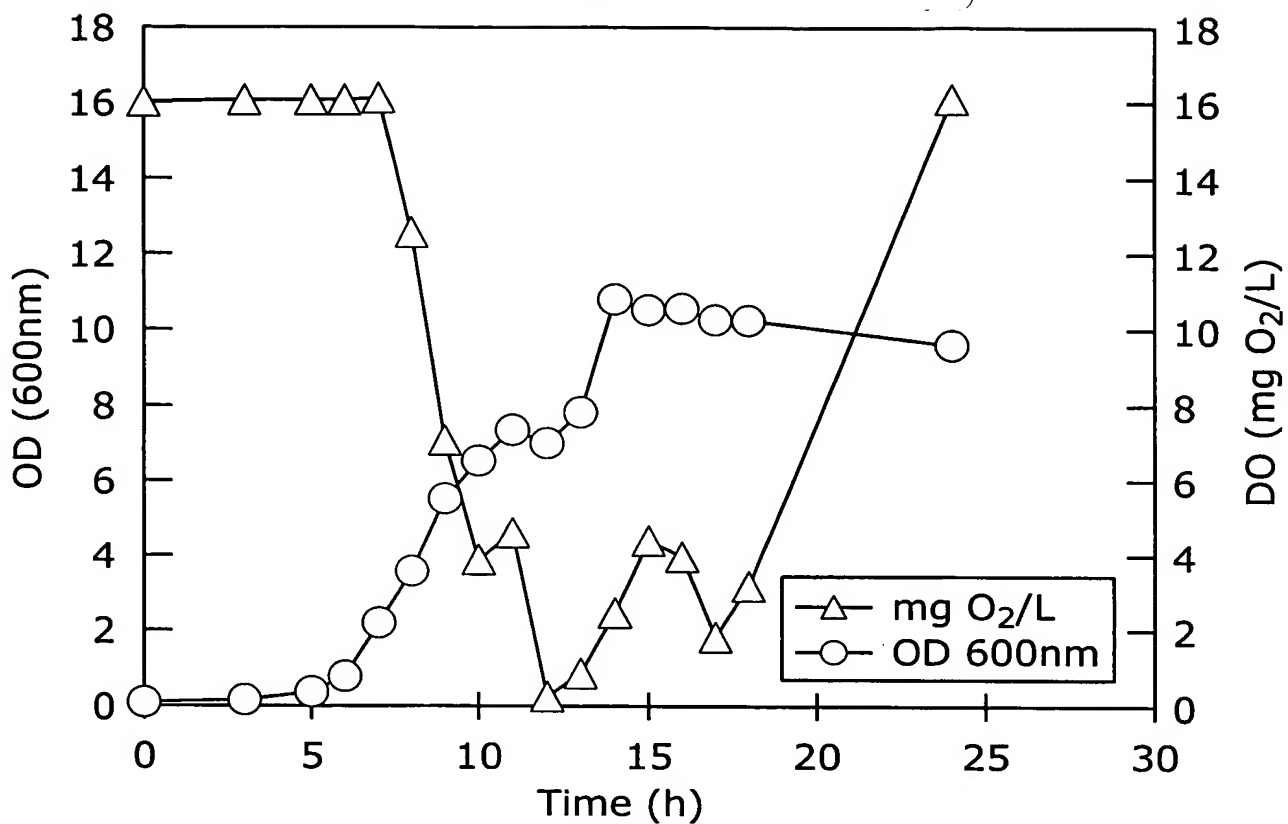


FIG. 18A

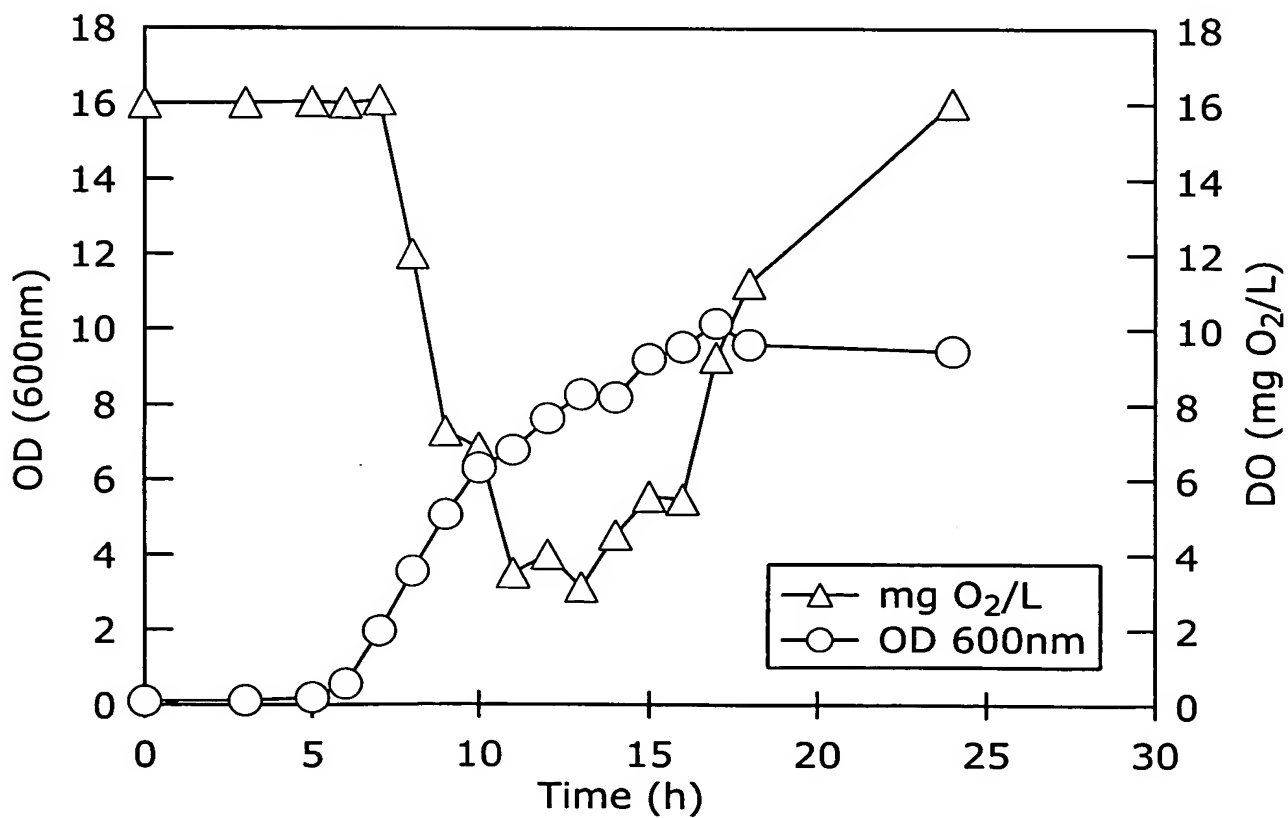


FIG. 18B

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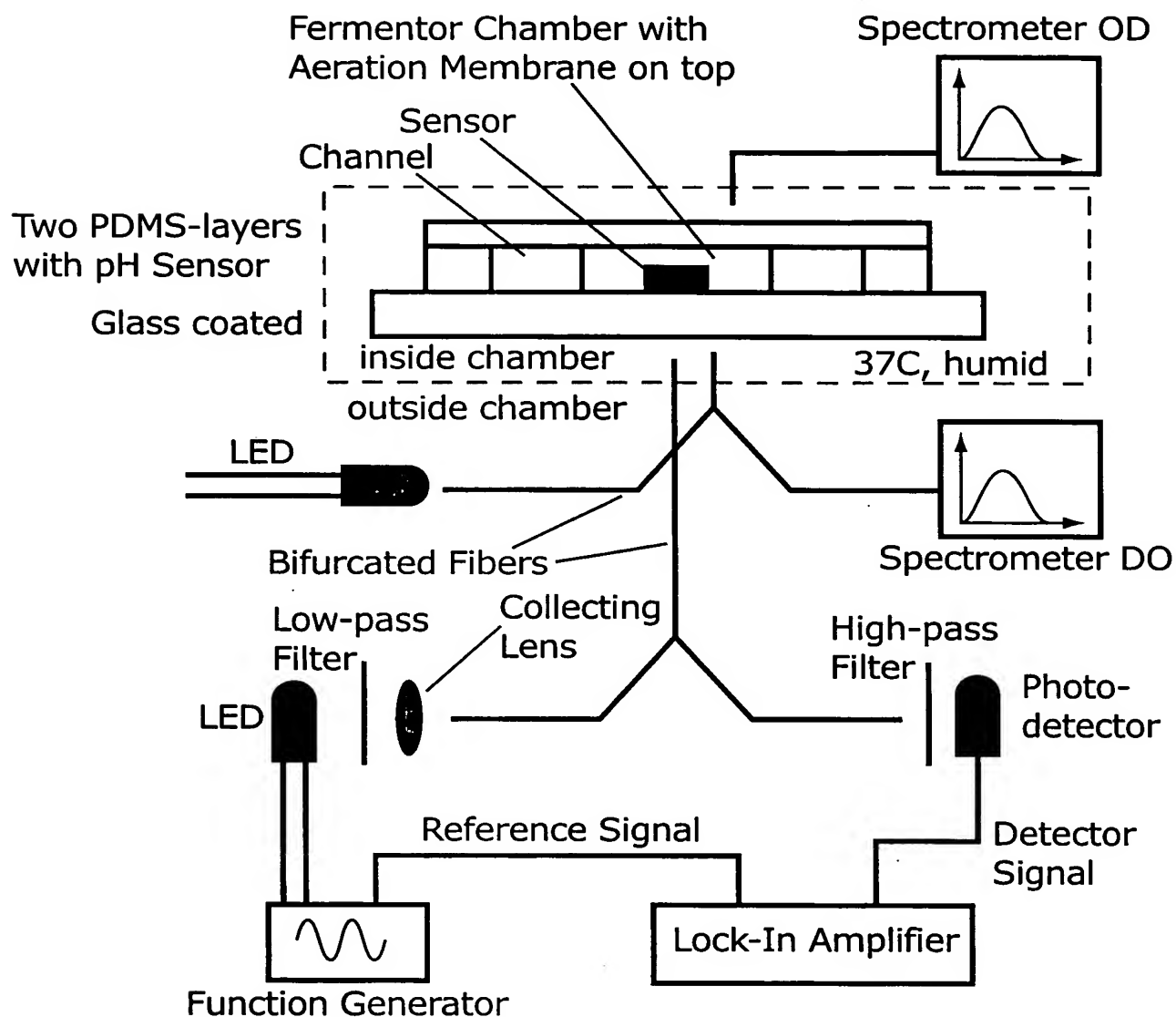


FIG. 19

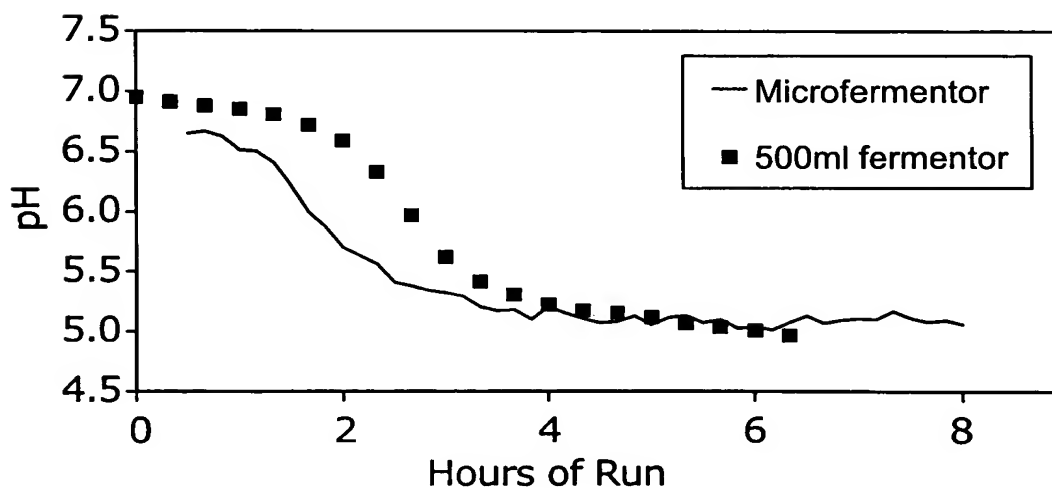


FIG. 20



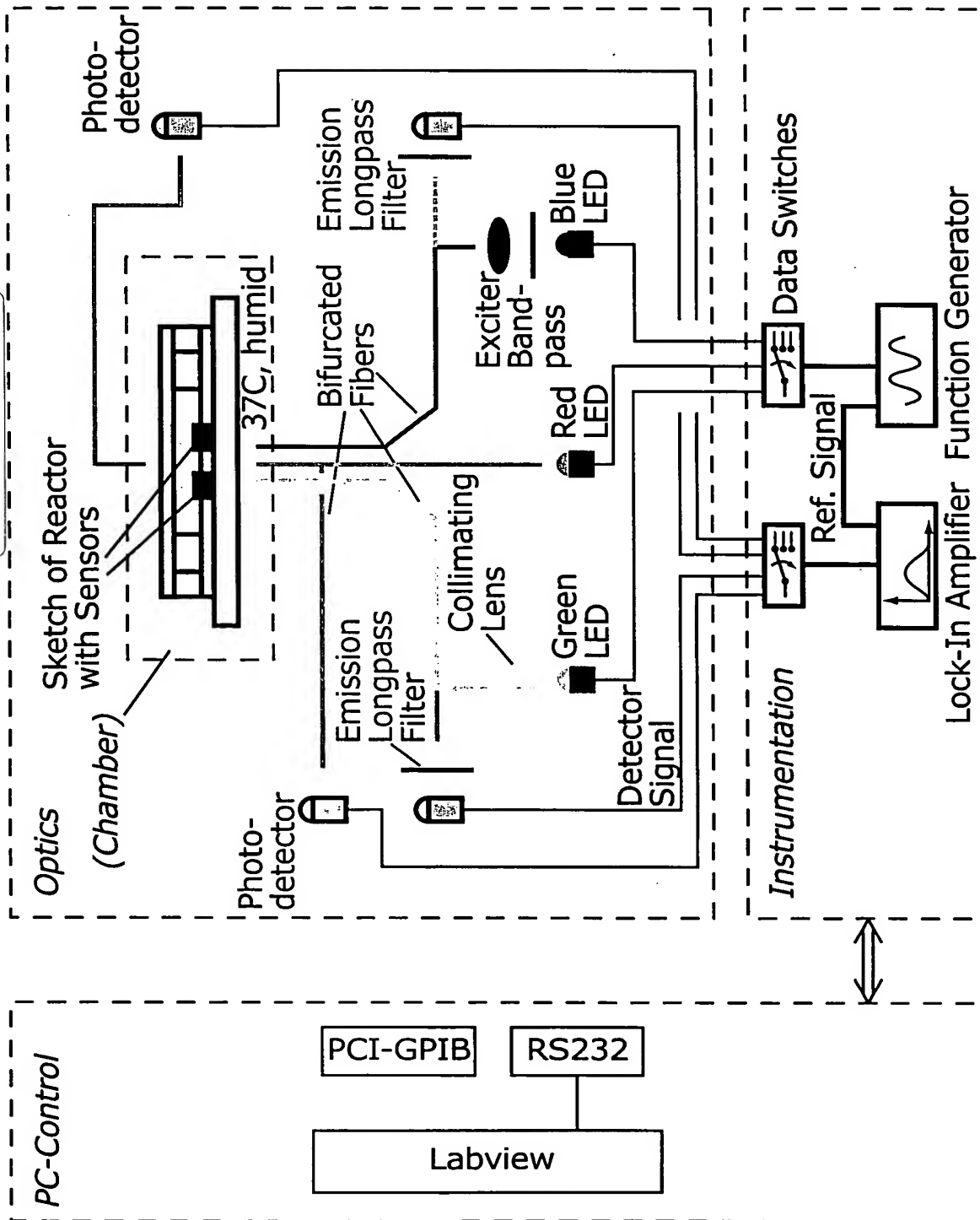


FIG. 21

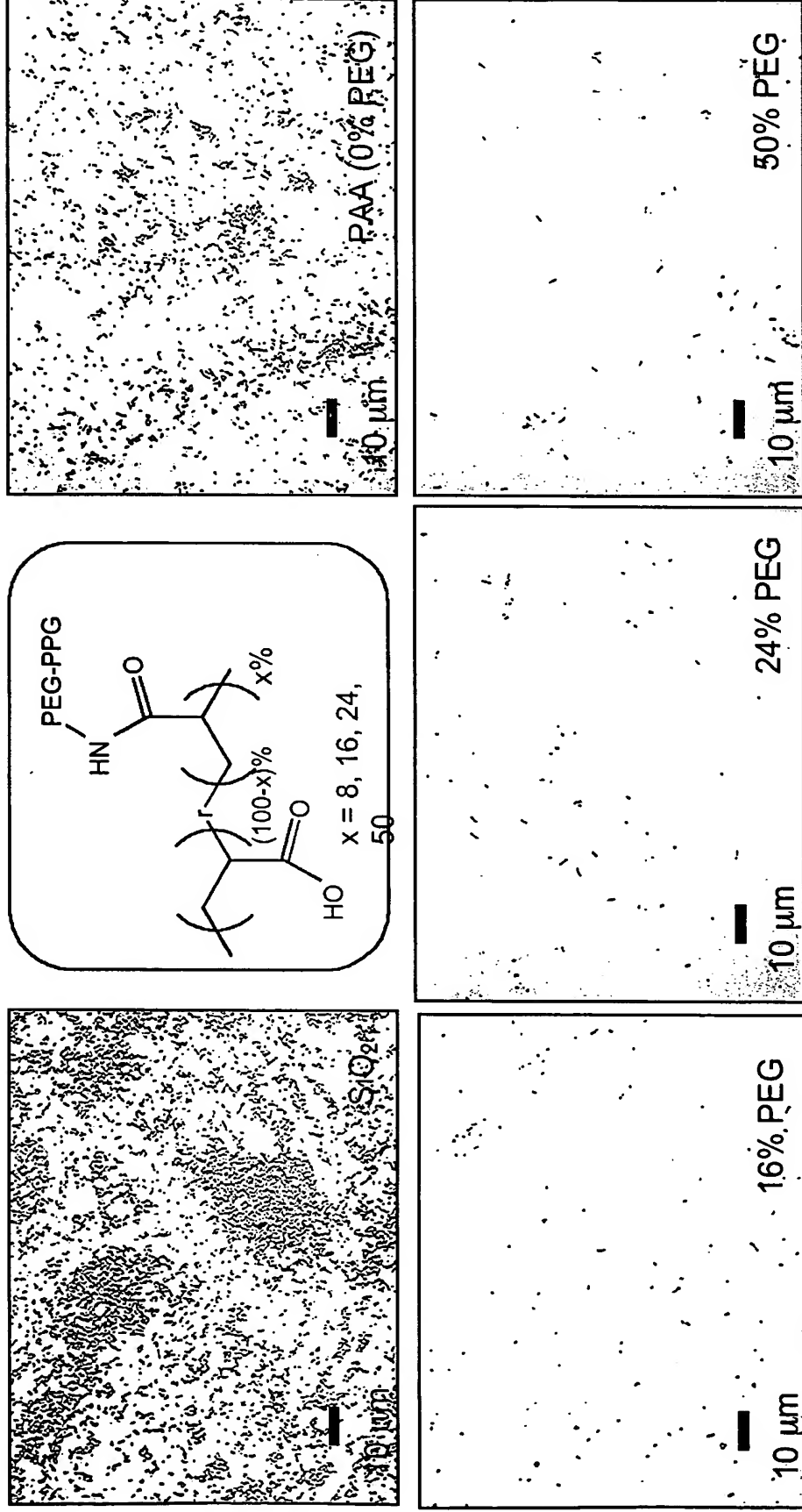


FIG. 22

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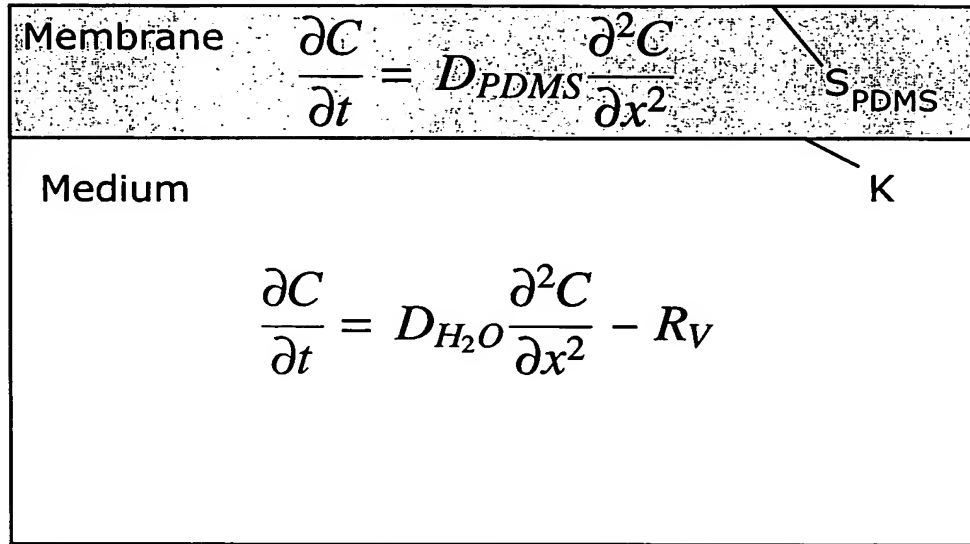


FIG. 23

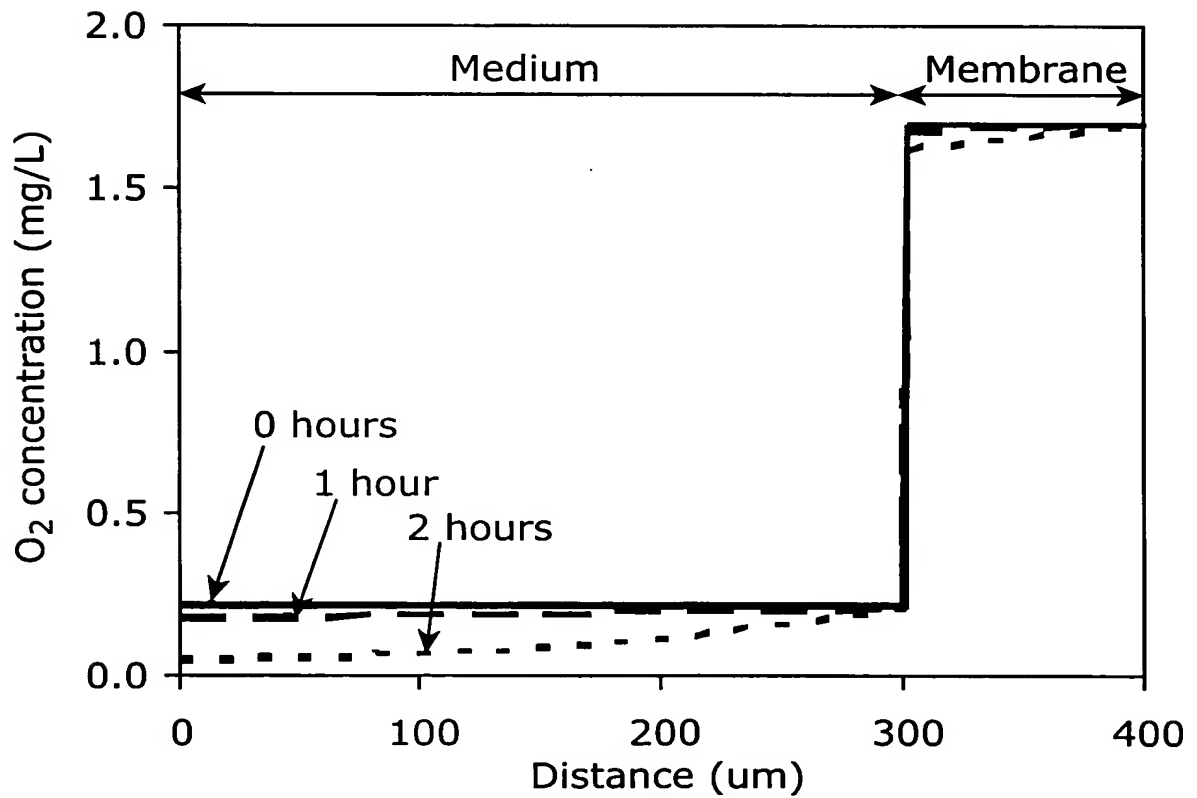


FIG. 24

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Figure 25A

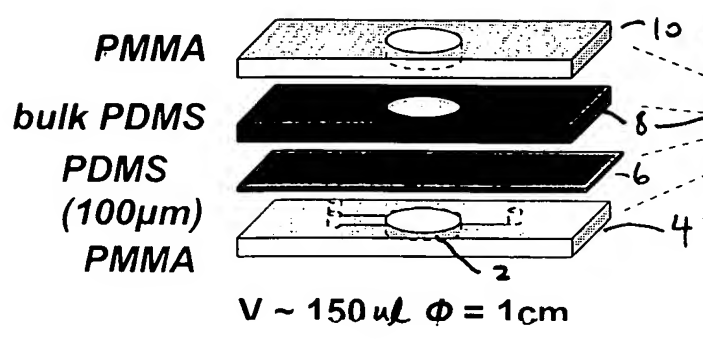


Figure 25B

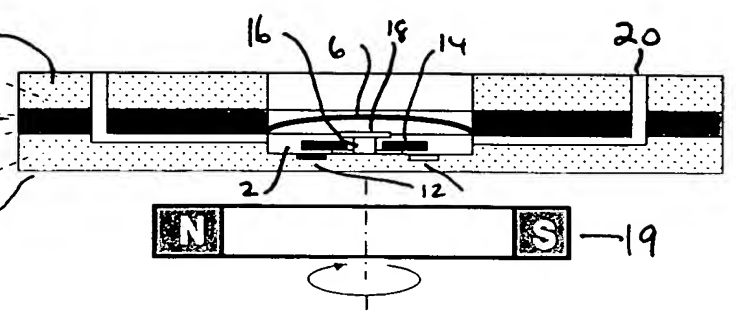
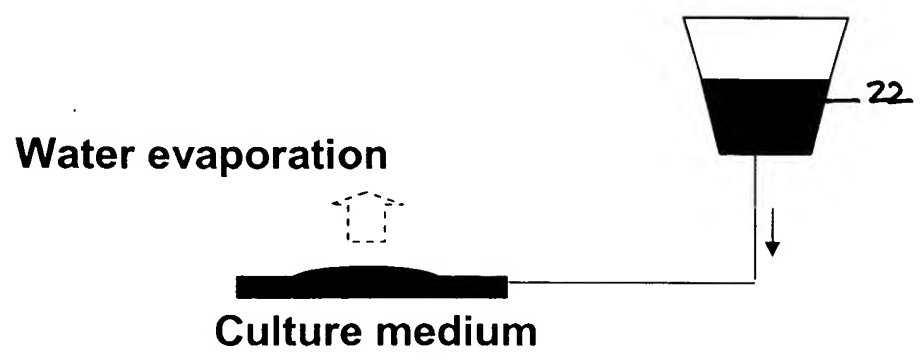


Figure 25C



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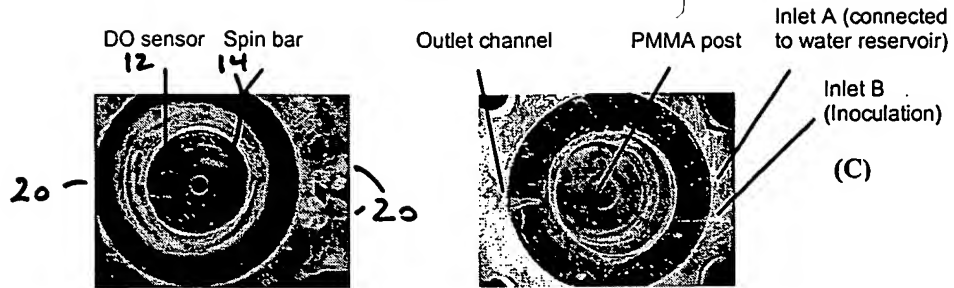
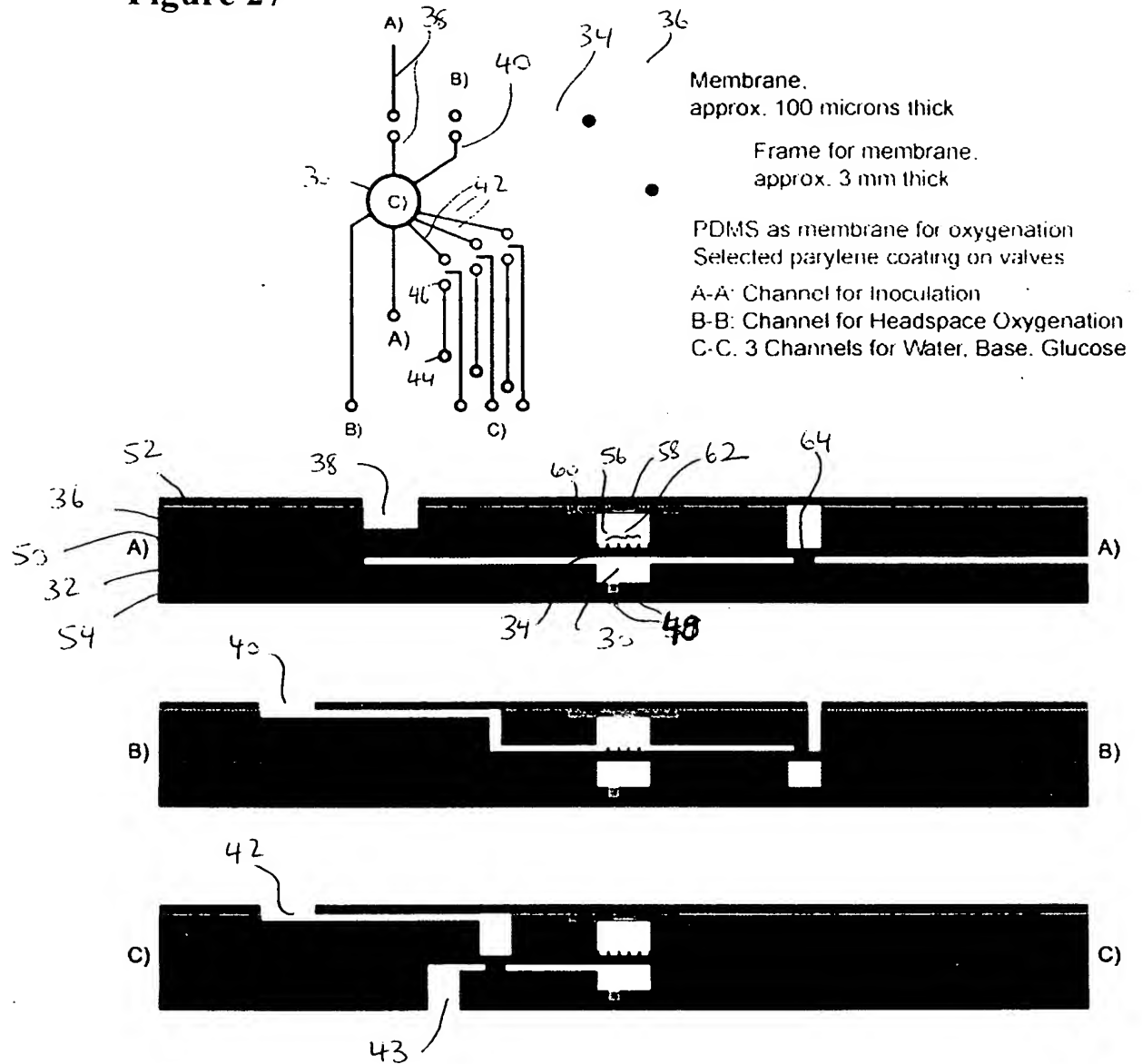


Figure 26A

Figure 26B

**Figure 27****Figures 28A – 28C**

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**Figure 29**

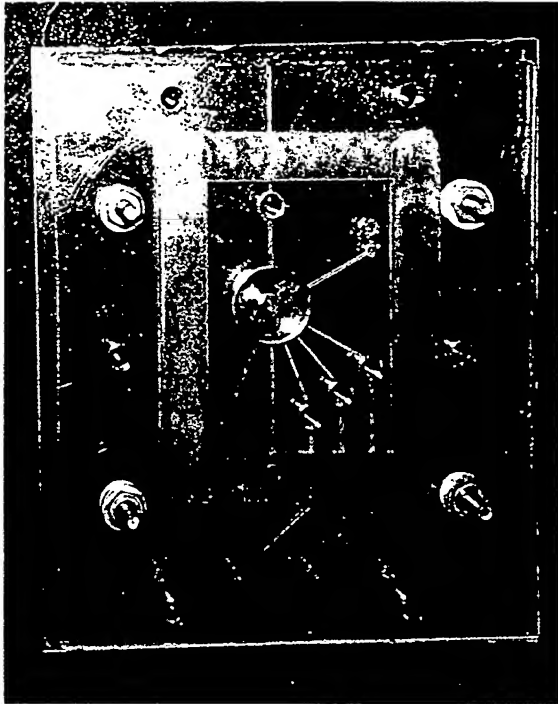
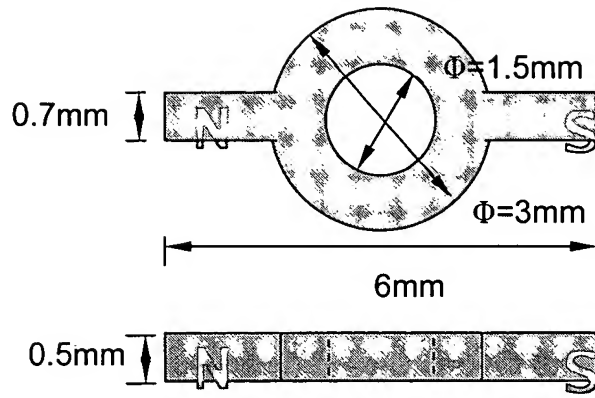


Figure 30

A



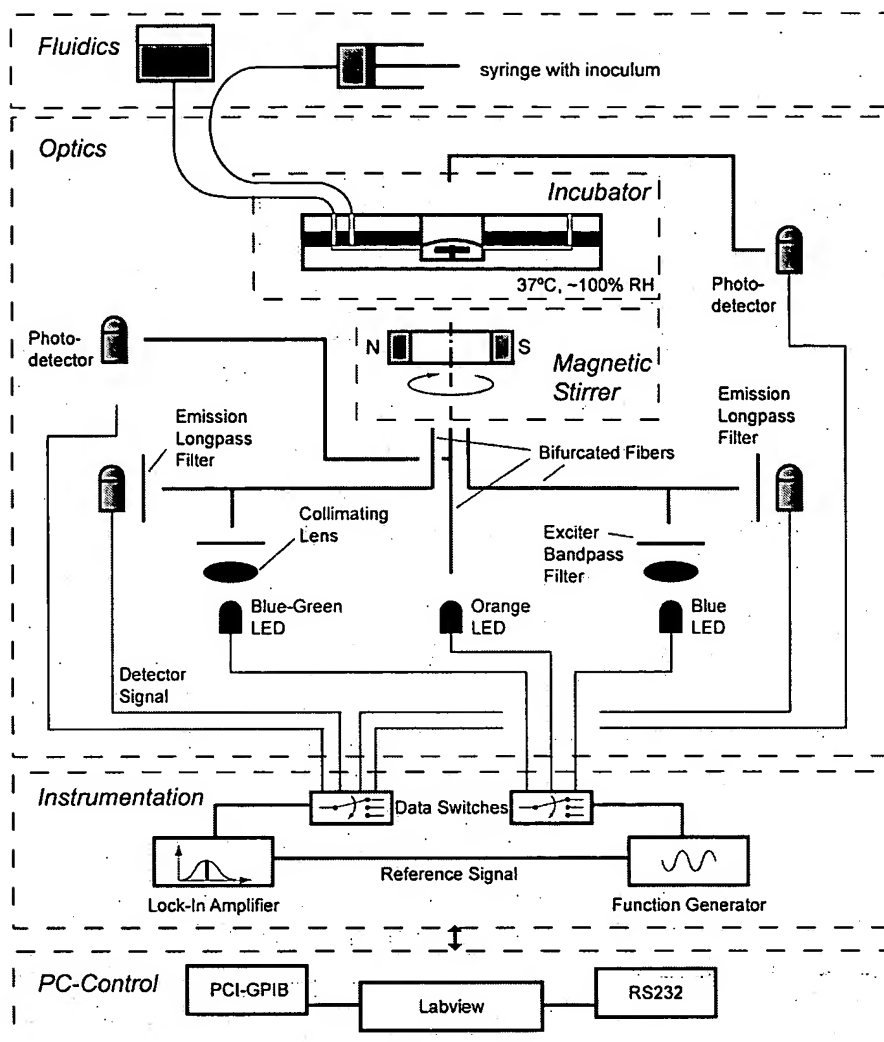
B





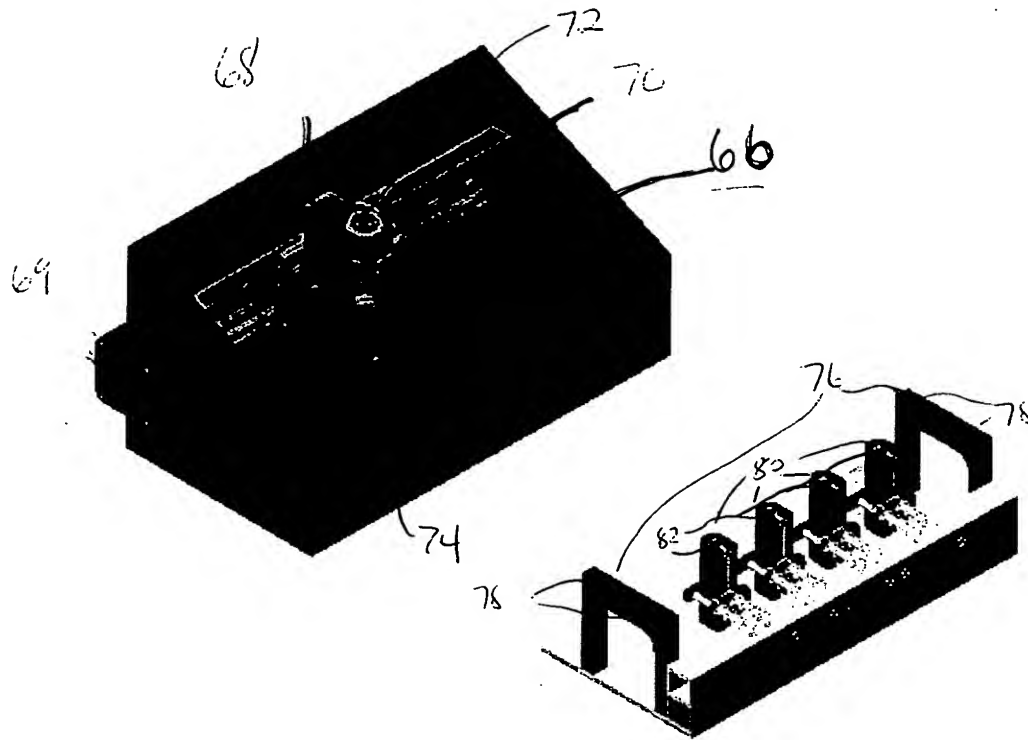
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Figure 31



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**Figure 32A**



**Figure 32D**

FIGURE 32B

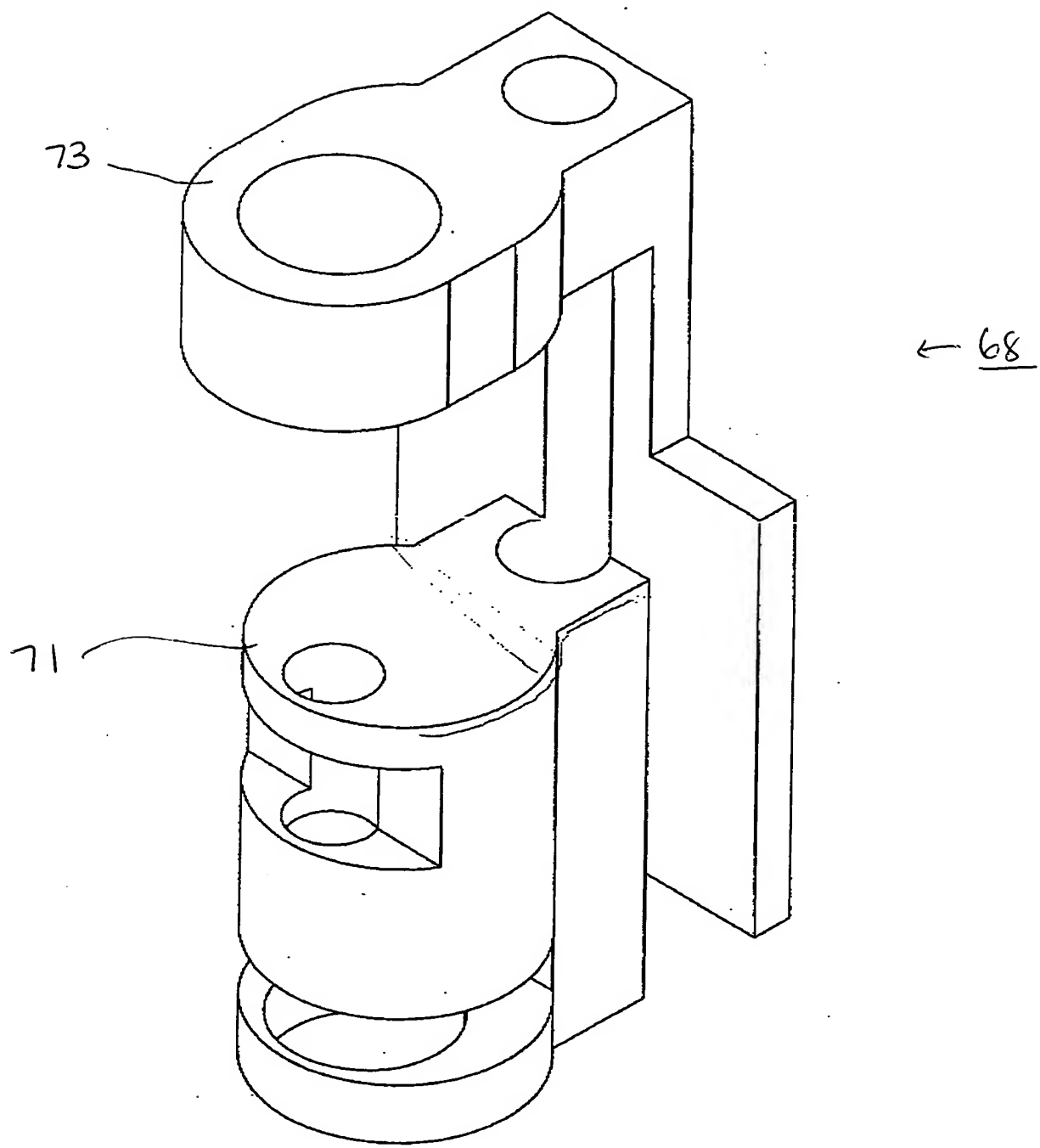
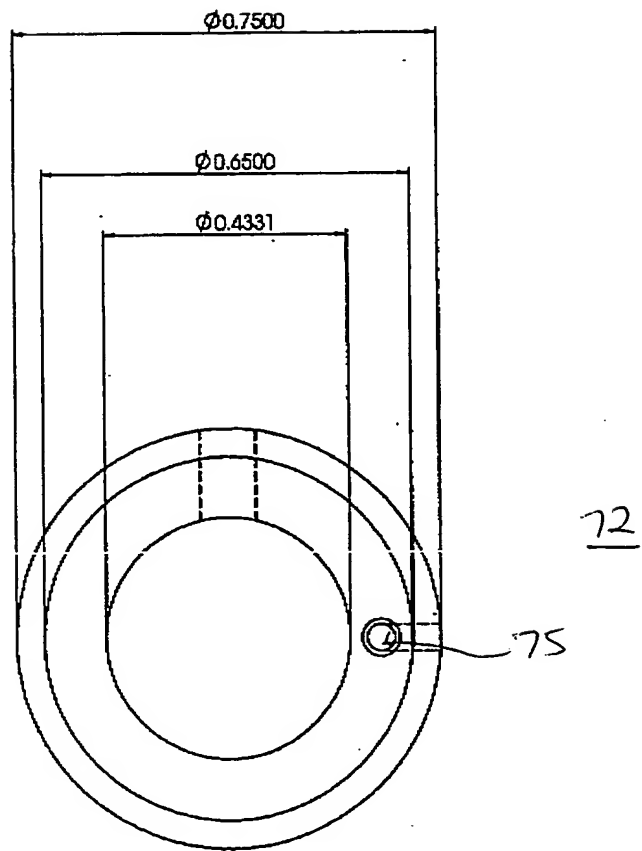


FIGURE 32C



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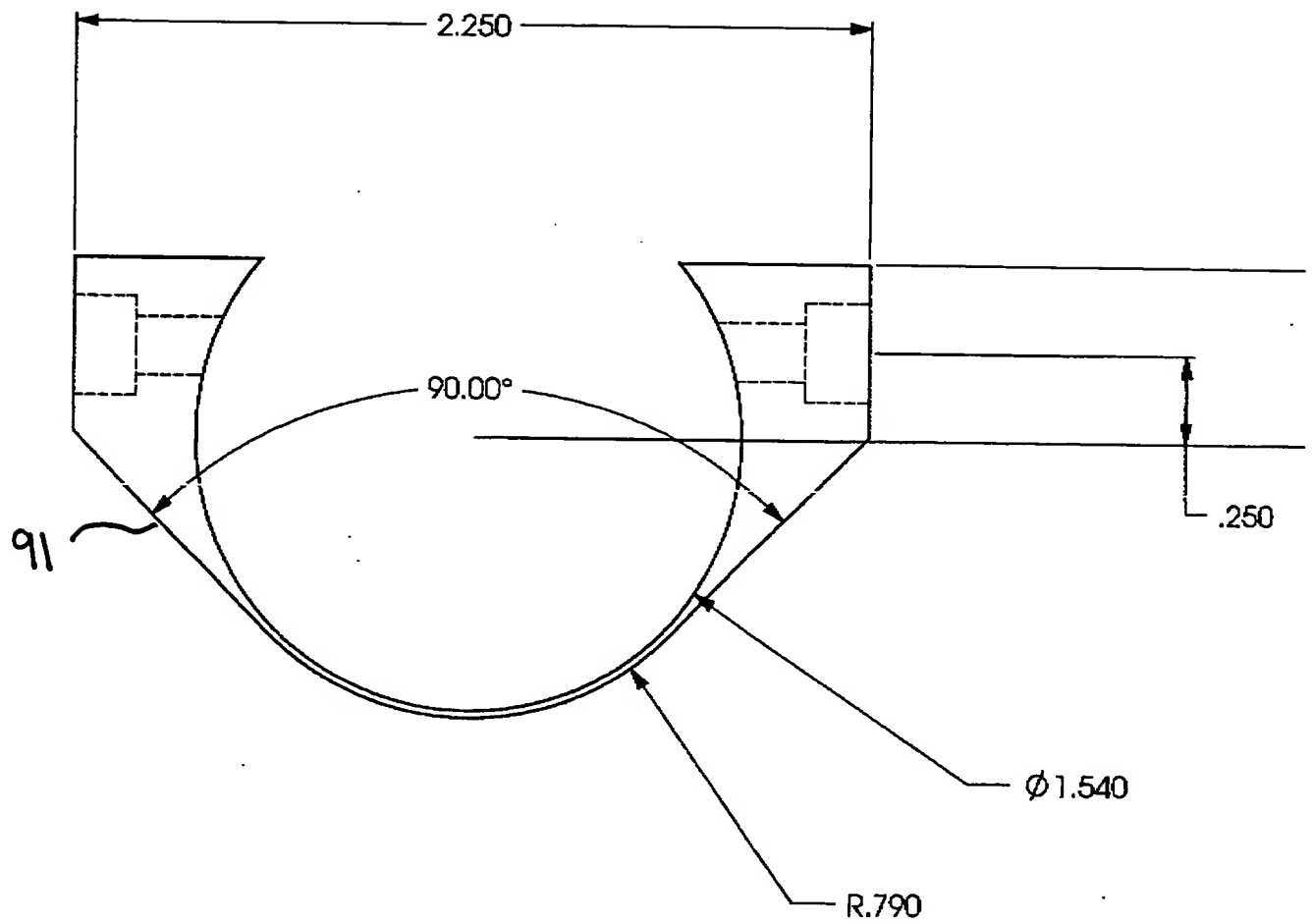
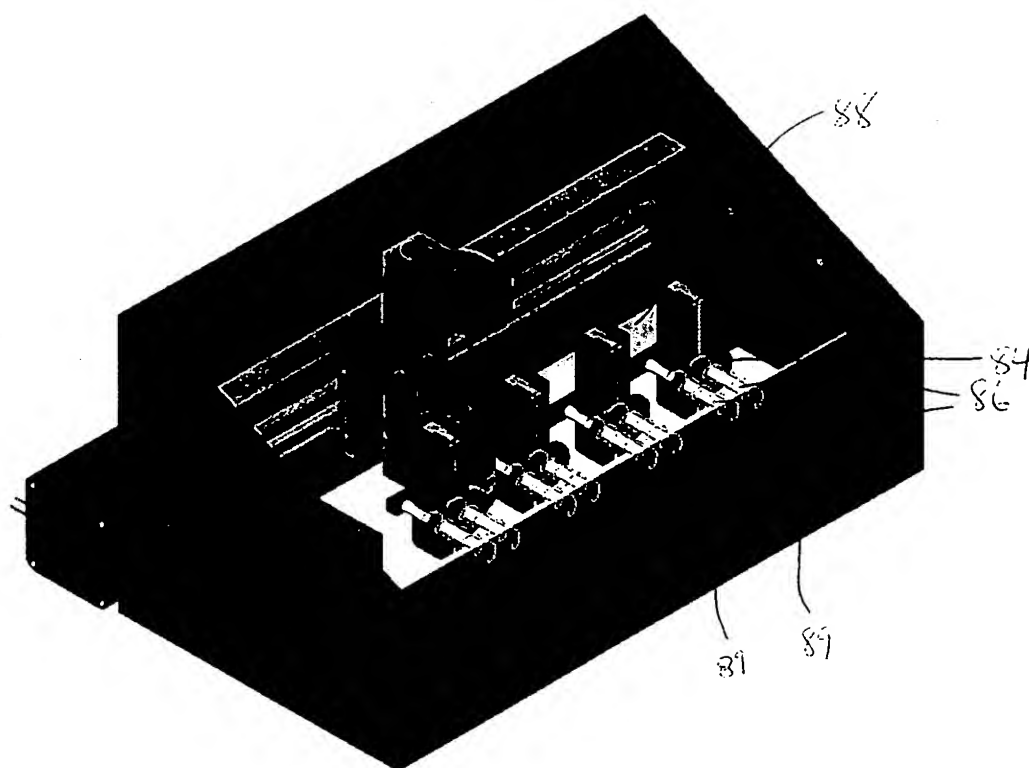


FIGURE 32E

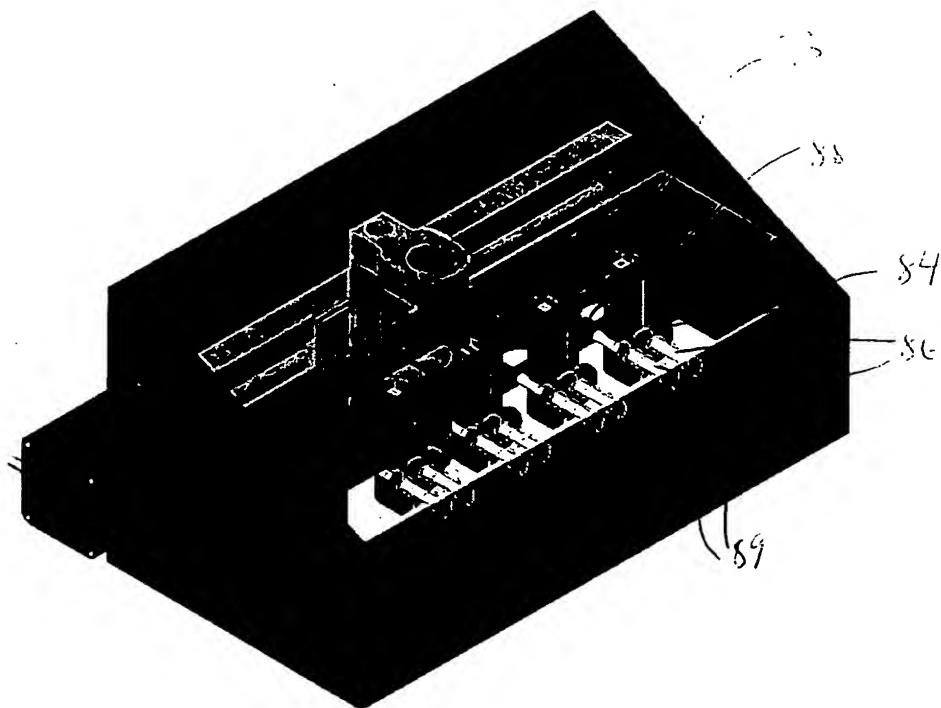
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Figure 33



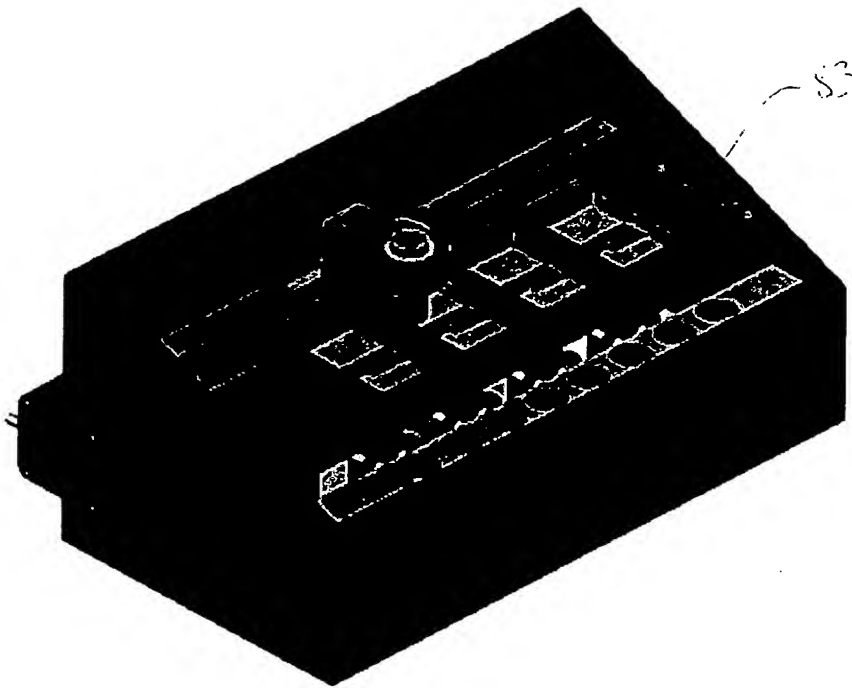
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Figure 34A



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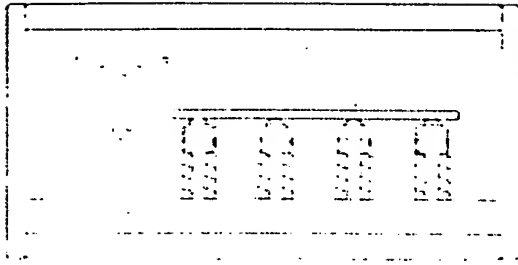
**Figure 34B**



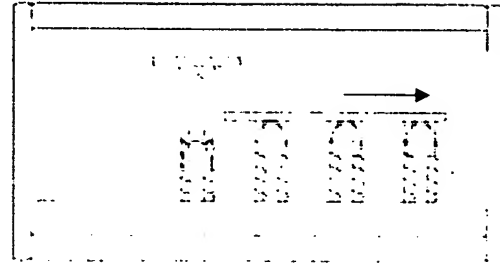


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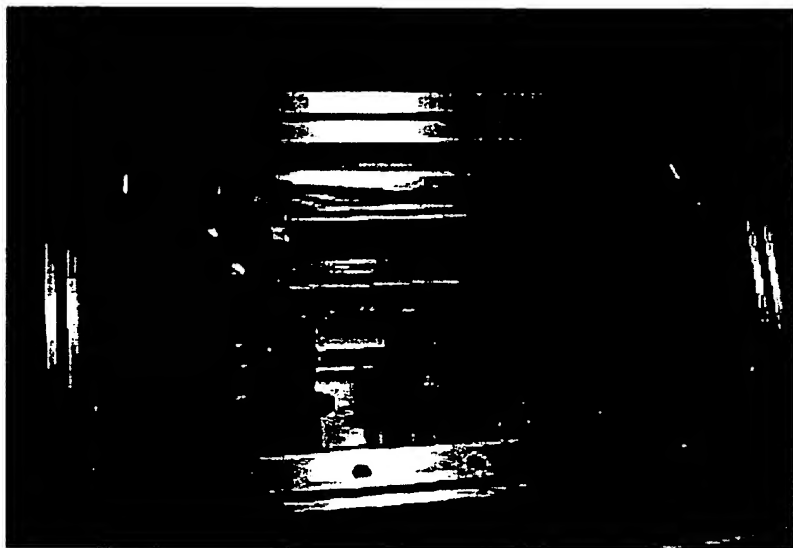
**Figure 35A**



**Figure 35B**



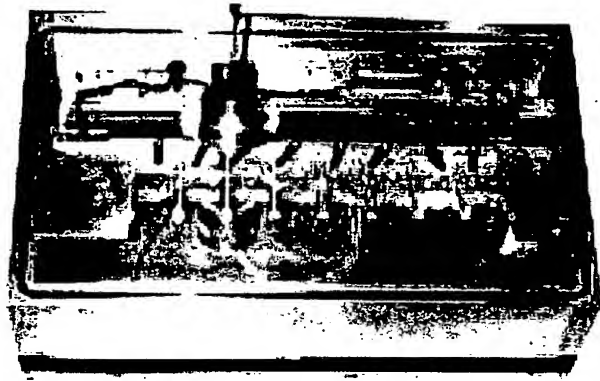
**Figure 36**



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**Figure 37**



**Figure 39**

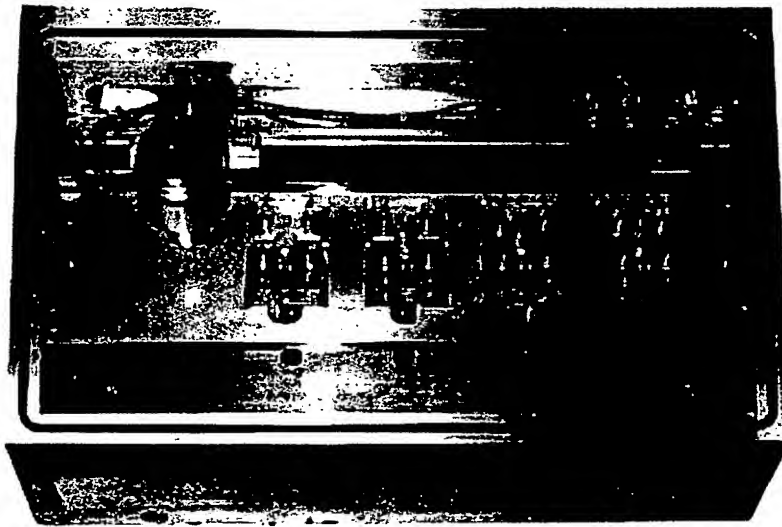




FIGURE 38B



FIGURE 38A

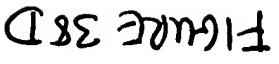
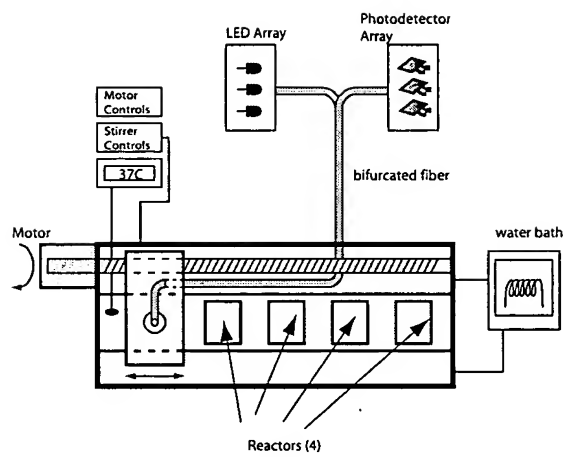


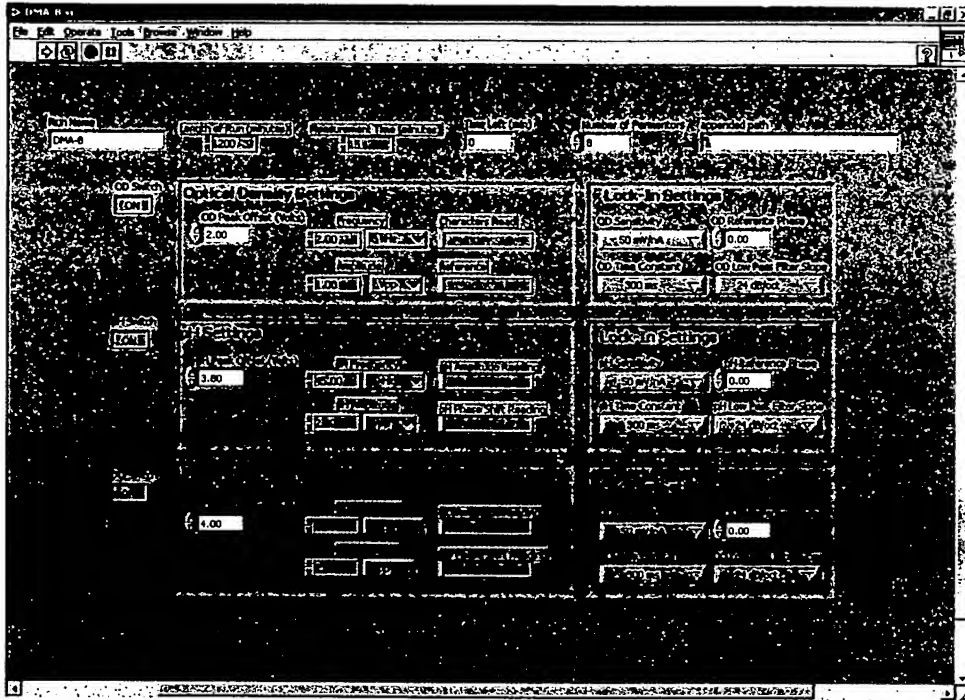
FIGURE 40A

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Figure 40B



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Figure 41

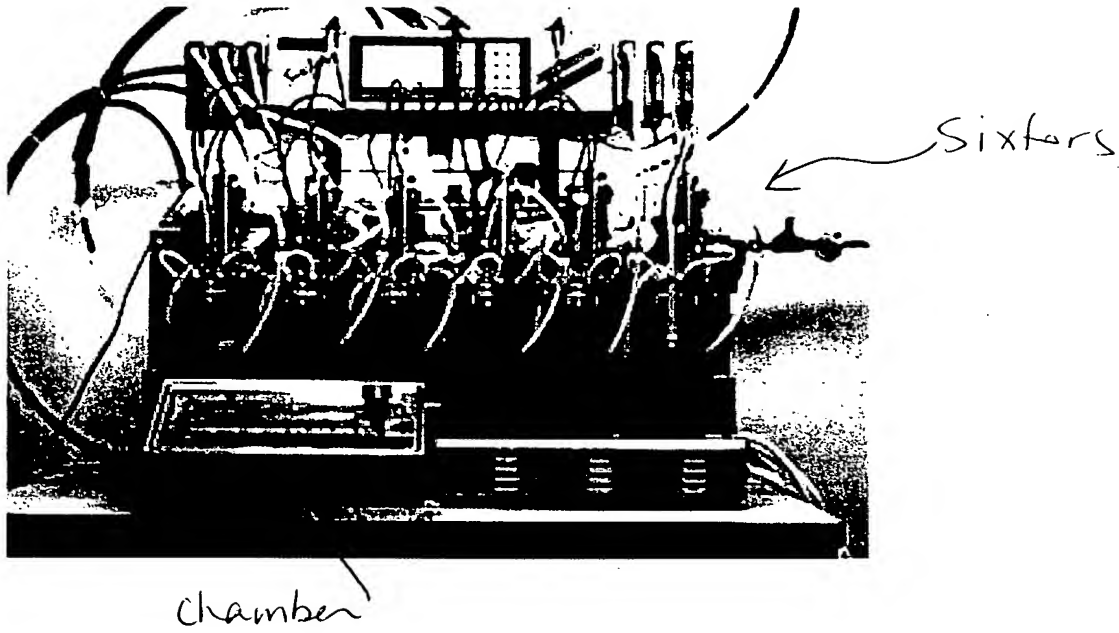


Figure 42

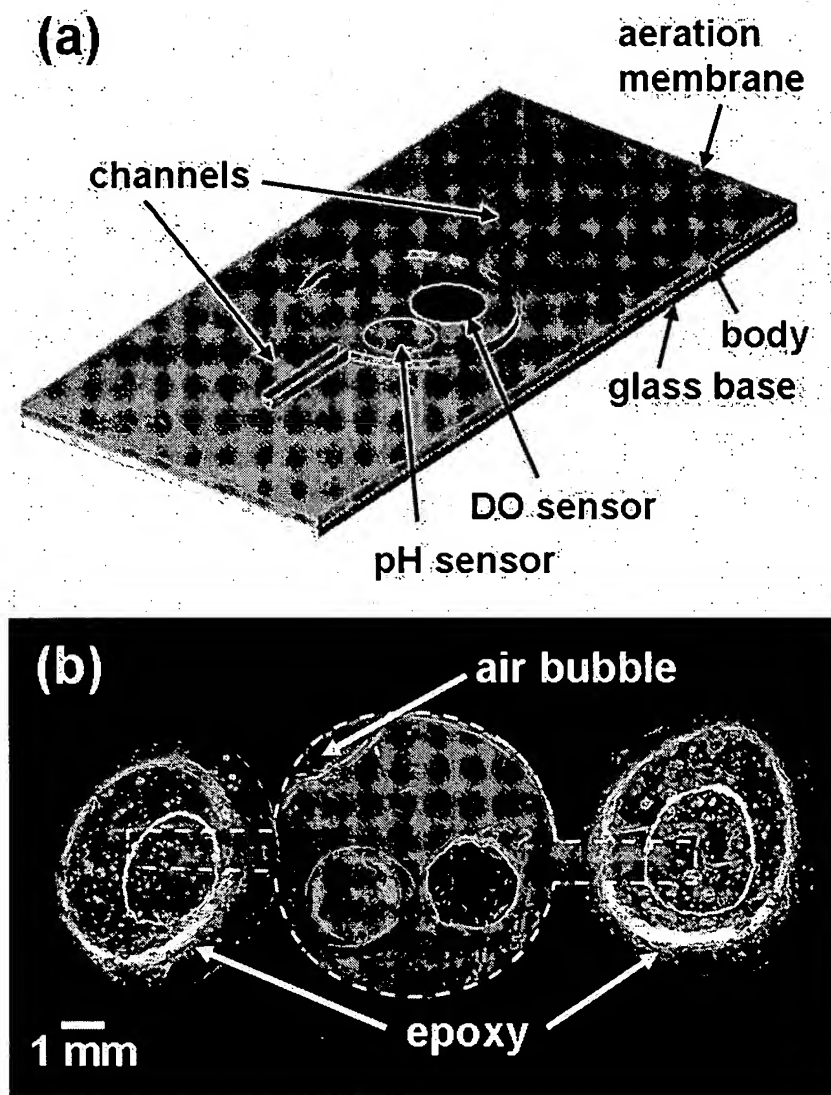
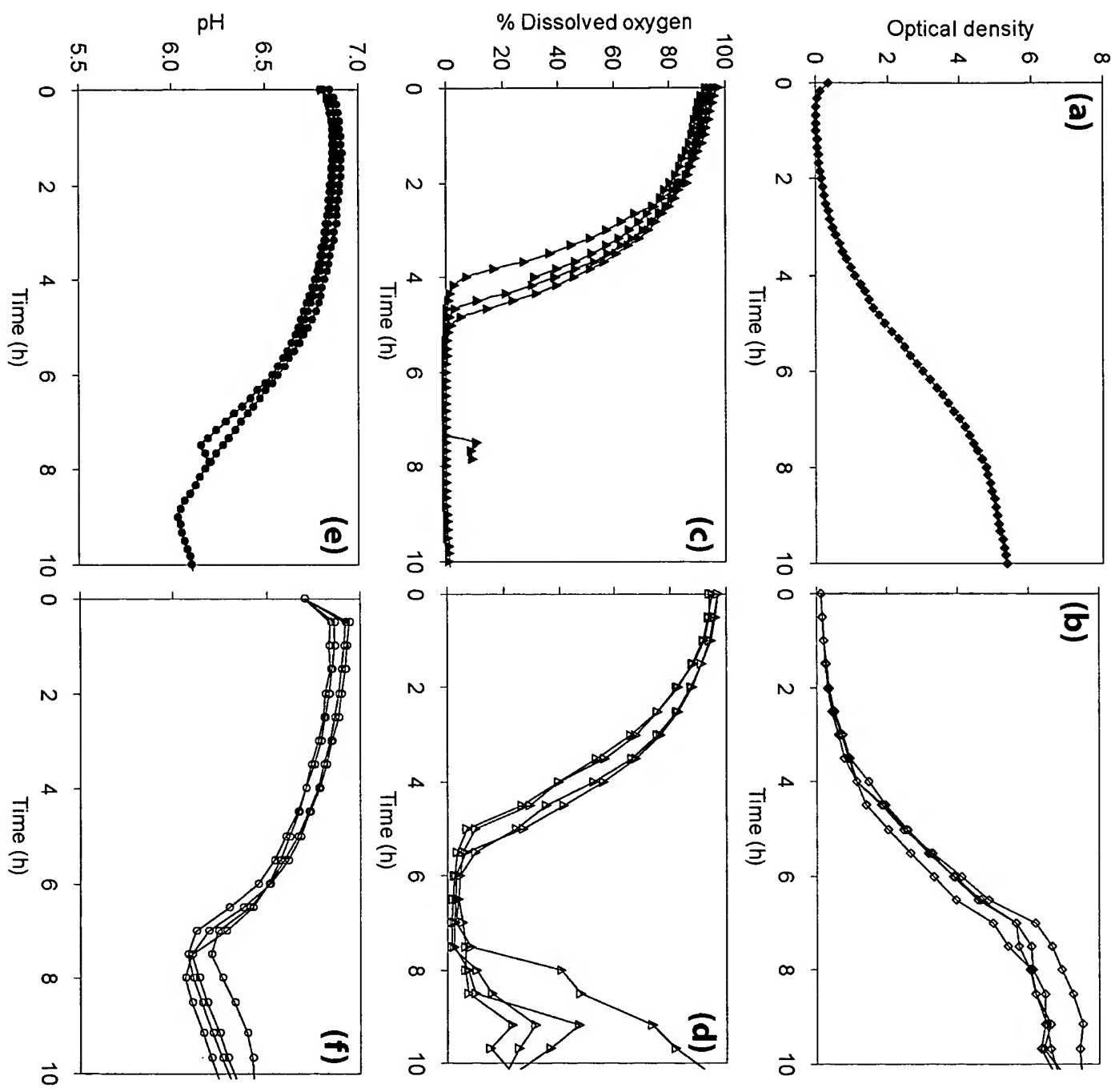


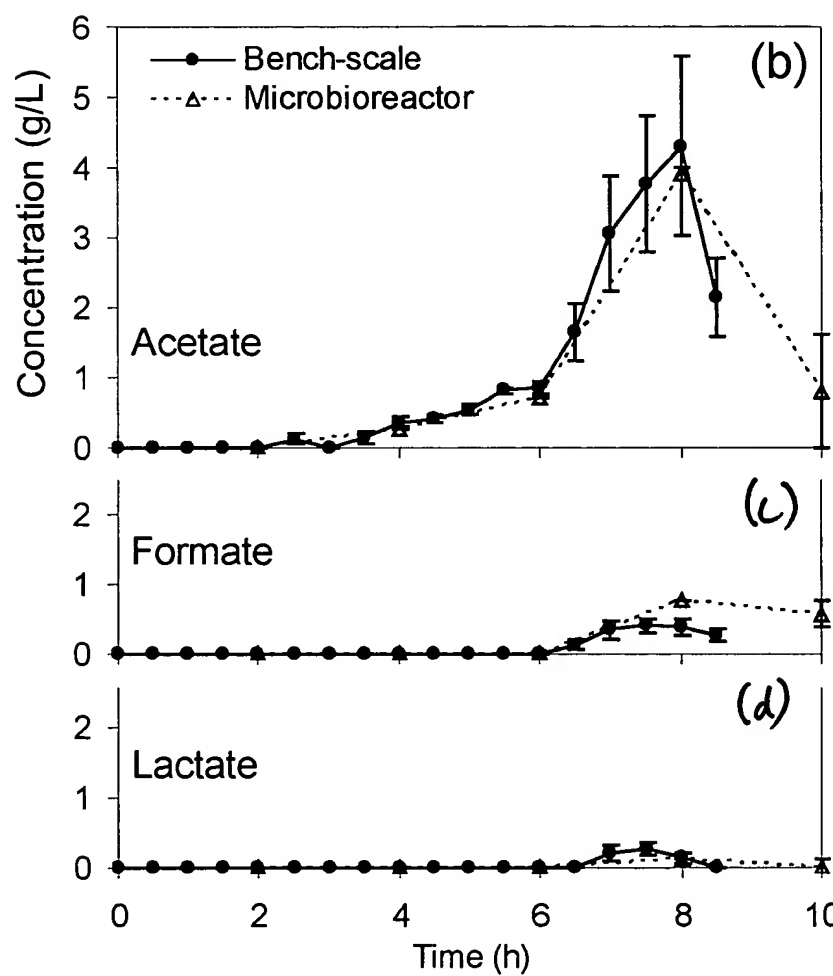
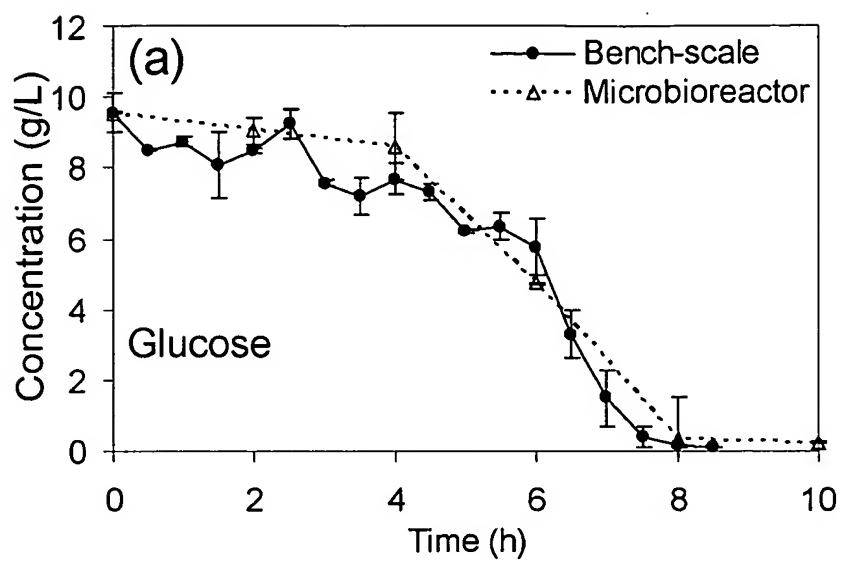
FIGURE 43



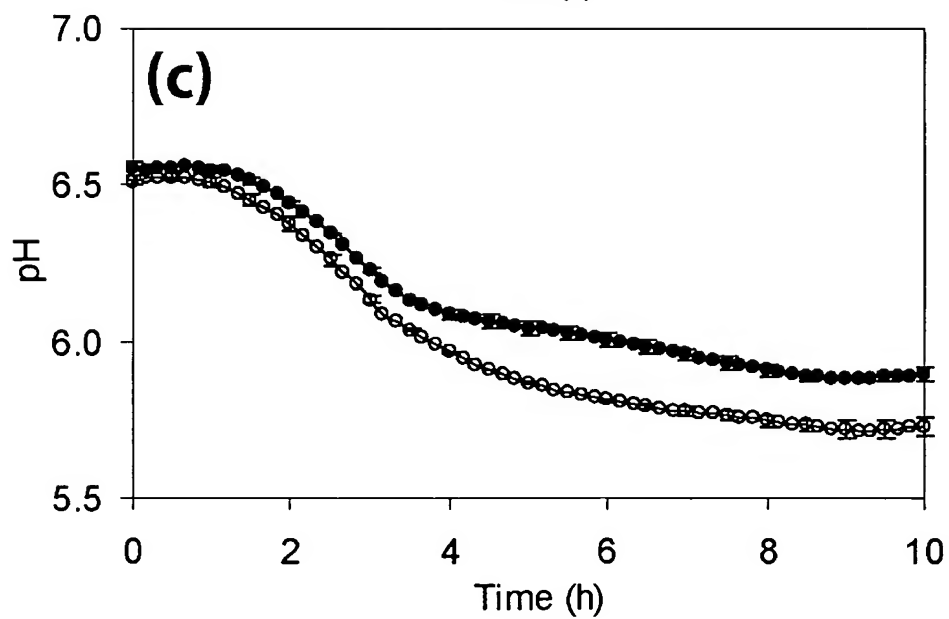
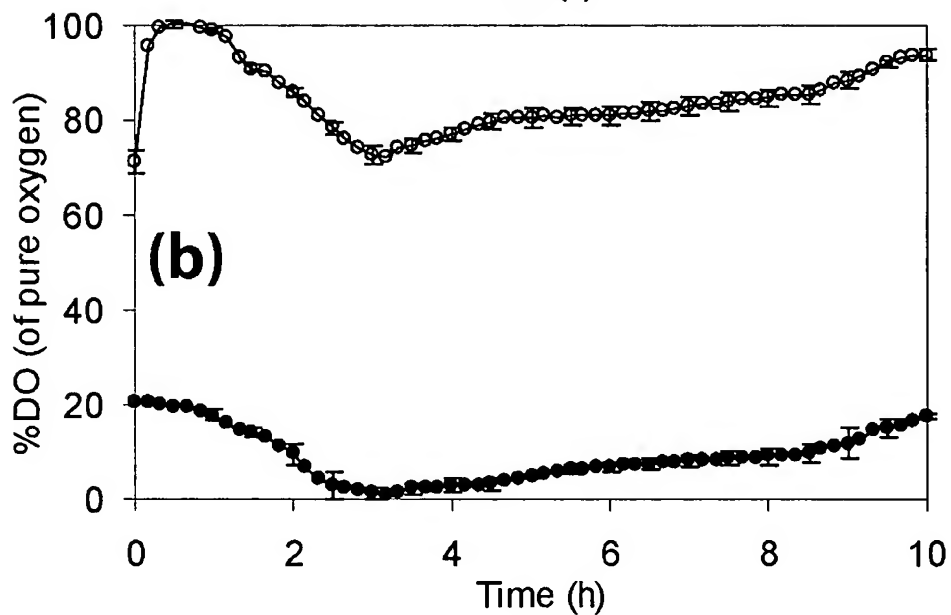
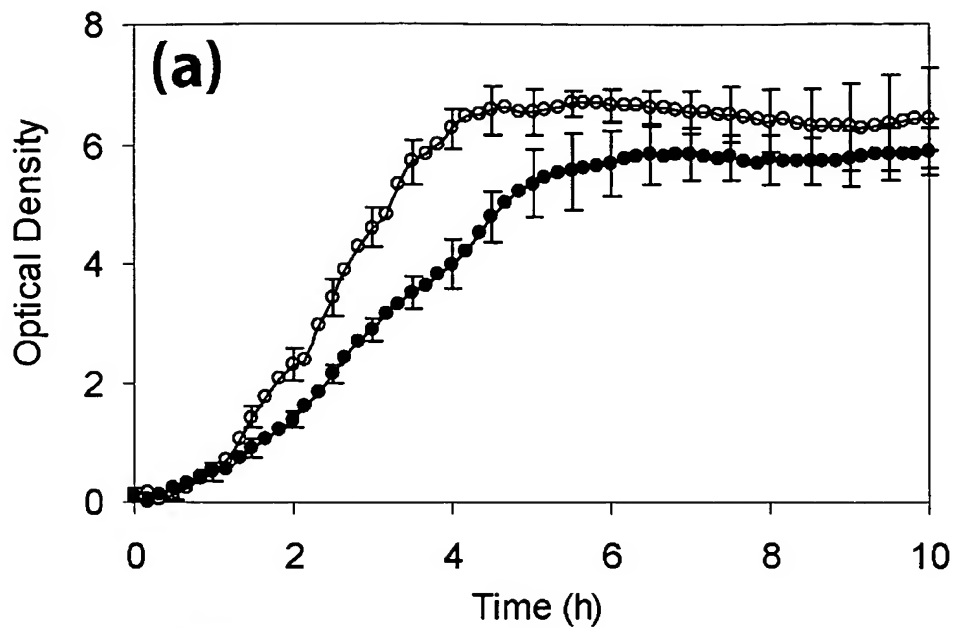
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FIGURE 44



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—○— Oxygen —●— Air

FIGURE 45

Figure 46A

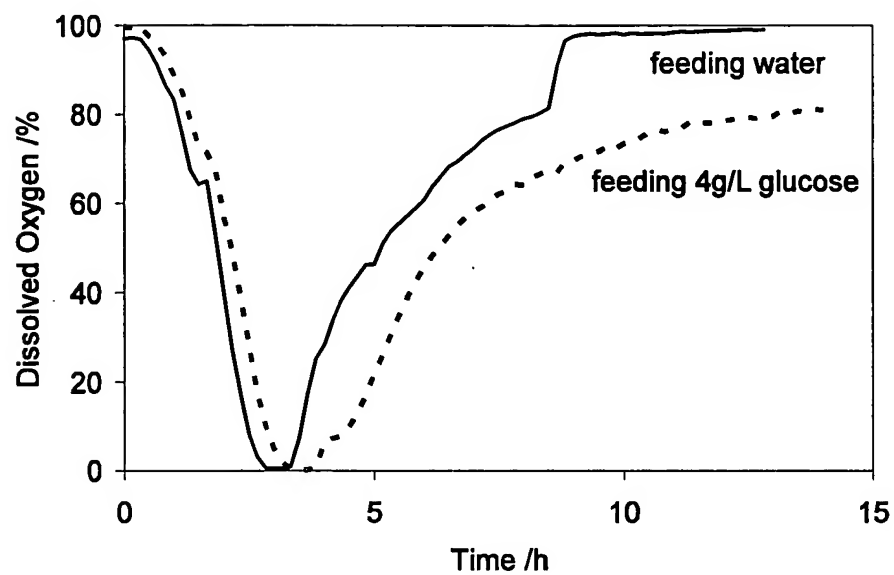
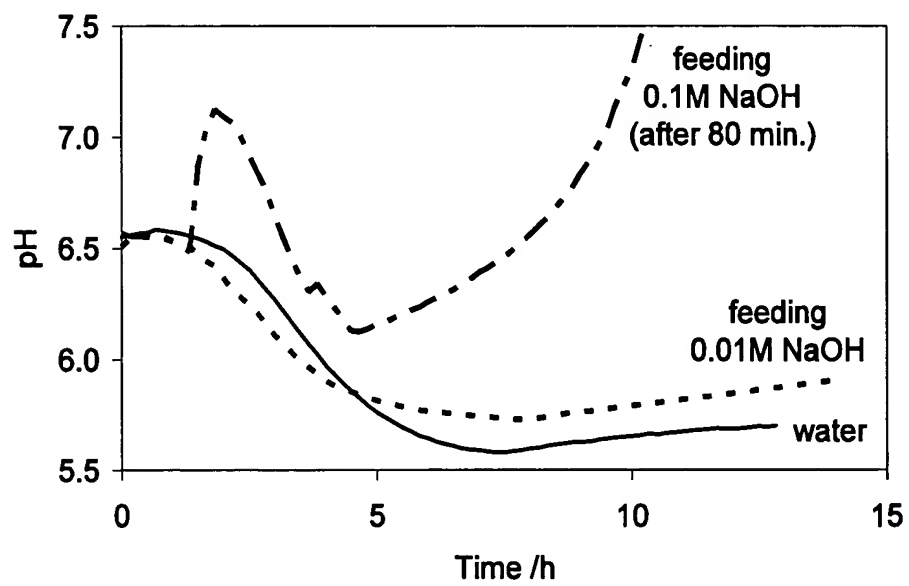


Figure 46B



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Figure 47A

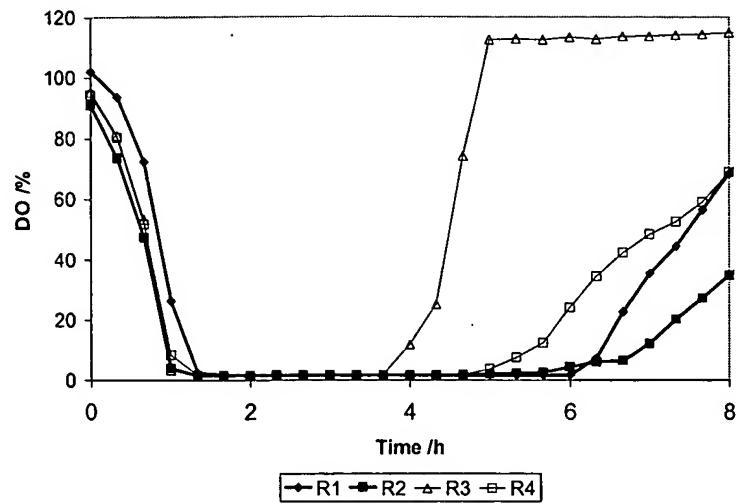
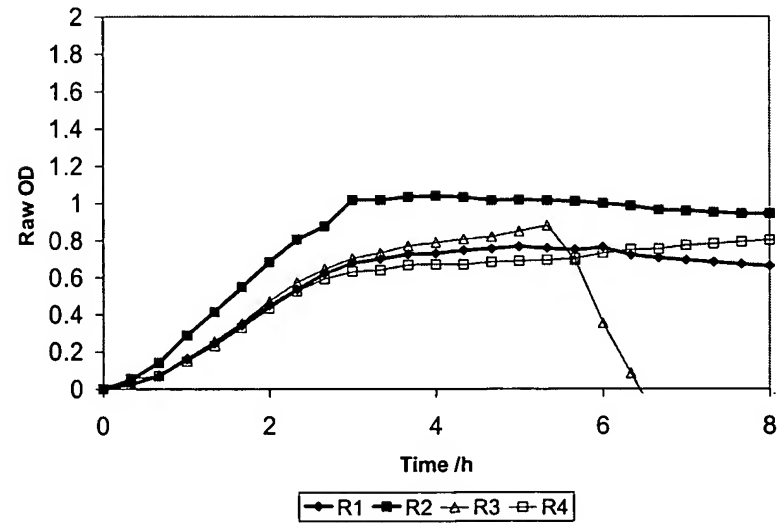
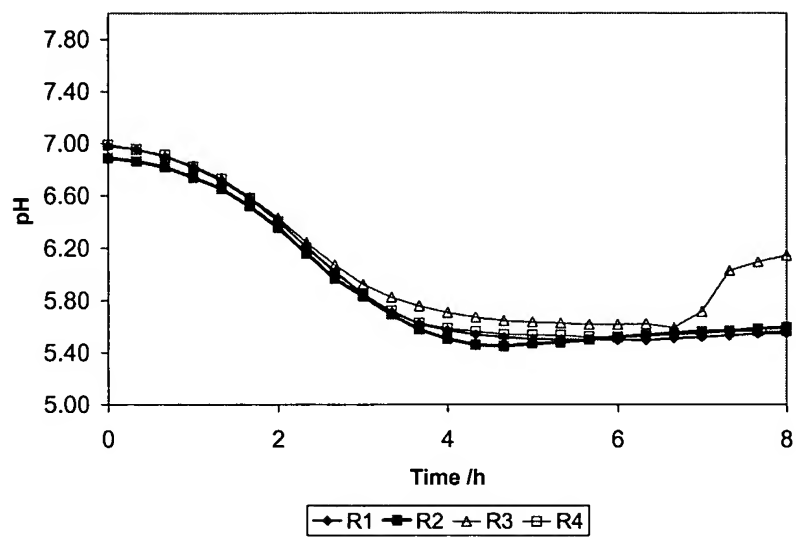


Figure 47B



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Figure 47C



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Figure 48A

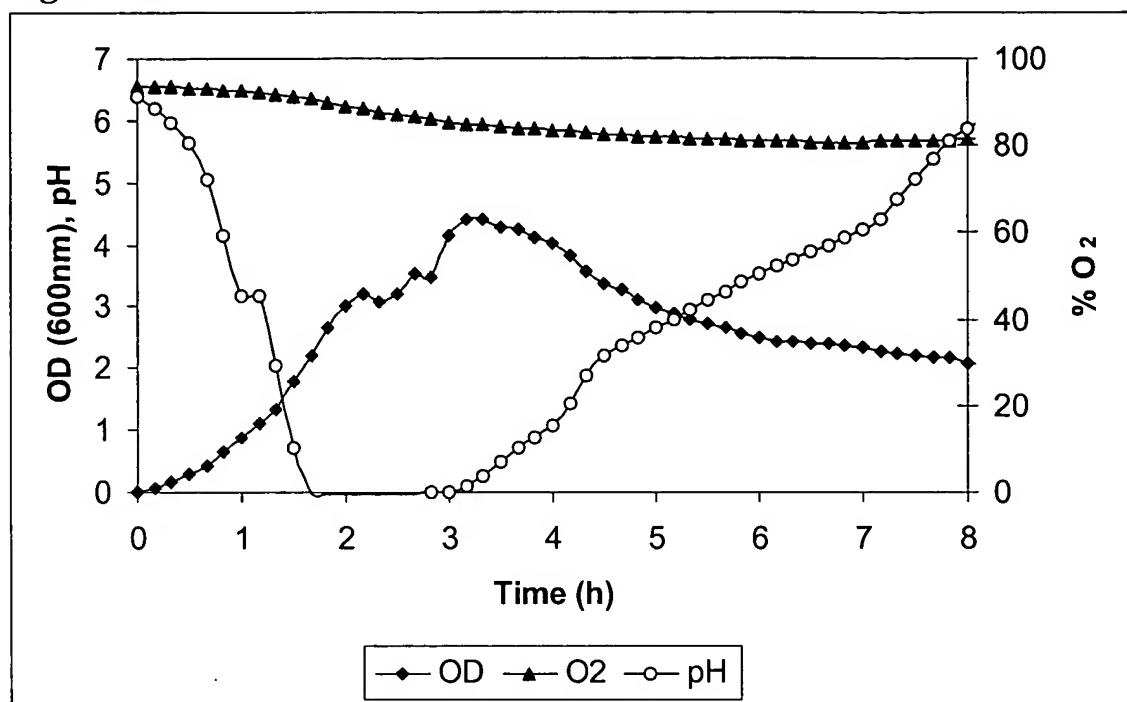
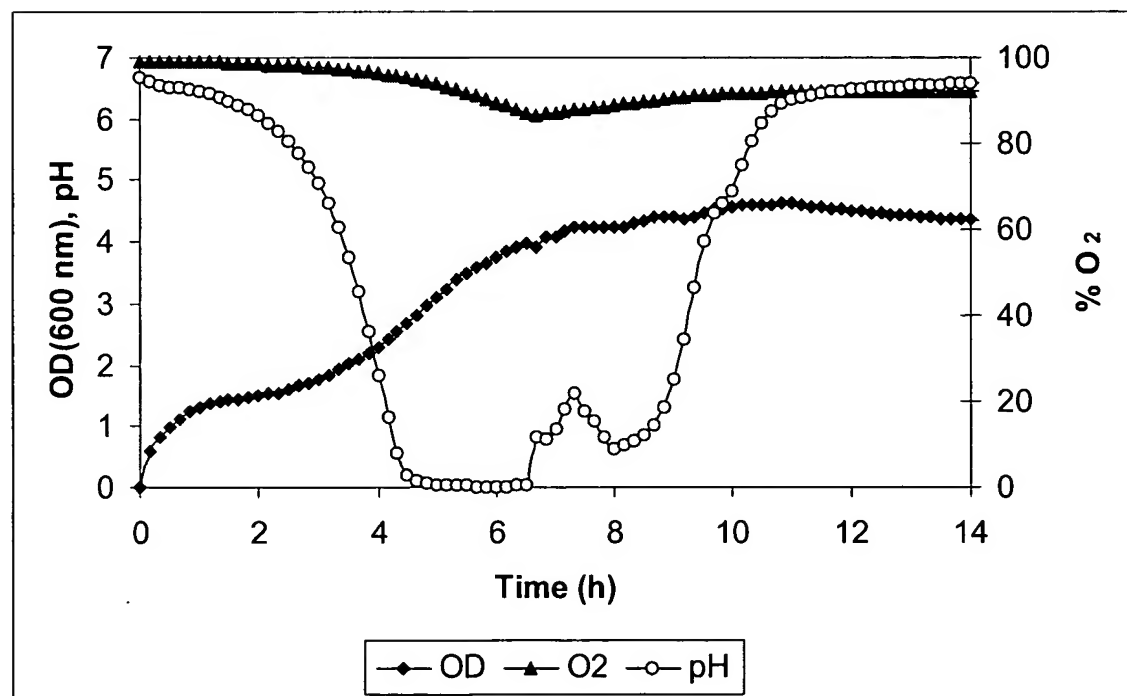


Figure 48B



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